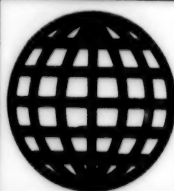


JPRS-TEN-94-016
23 June 1994



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JPRS Report

Environmental Issues

Environmental Issues

JPRS-TEN-94-016

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Shanghai's Environment Improves as Its Economy Grows

OW0606142994 Beijing XINHUA Domestic Service
in Chinese 0802 GMT 6 Jun 94

[By reporter Ji Jincheng (1323 6651 2052)]

[Text] Shanghai, 6 Jun (XINHUA)—While experiencing a great margin of economic growth last year, Shanghai city witnessed a remarkable drop in discharges of industrial waste water and waste gases. However, the city's solid waste discharge increased in 1993. These are facts revealed in the "1993 Communique on Shanghai City's Environmental Situation" recently released by the Shanghai Municipal Environmental Protection Bureau.

The communique says that Shanghai scored a GNP of 51 billion yuan in 1993, an increase of 14.9 percent over the 1992. Its industrial growth was 16.8 percent in 1993. Meanwhile, Shanghai's annual industrial waste water discharge was 1.28 billion tons in 1993, a drop of 6.5 percent from the 1992 record. The volume of industrial waste water treated in 1993 reached 1.09 billion tons, representing an increase of 5.5 percent over 1992. The discharges of major pollutants in industrial waste water witnessed a drop in 1993 from the 1992 record. Last year, the city consumed 32.736 million tons of coal, a slight increase over 1992. In 1993, Shanghai's total discharge of waste gases amounted to 423.05 billion cubic meters, including 385.92 billion cubic meters of industrial waste gases, representing a drop of 17.2 percent and 12.6 percent respectively from the 1992 record. The discharges of major pollutants in waste gases decreased to various extents, as compared with 1992. Industrial solid wastes increased by 4.9 percent over 1992, reaching 11.98 million tons.

In terms of Shanghai's environmental quality in 1993, the communique has the following overall evaluation: The quality of water and air is better than 1993 but there is little progress in reducing noise.

Accident Free Record Claimed for China's Nuclear Industry

HK0706125894 Hong Kong ZHONGGUO TONGXUN
SHE in Chinese 1010 GMT 4 Jun 94

[Text] Beijing, 4 Jun (ZHONGGUO TONGXUN SHE)—An official of the Security Bureau of China National Nuclear Corporation recently said that in the past 40 years since the founding of China's nuclear industry, no environmental pollution incident had ever occurred; although China's nuclear industry developed later than in other countries, its operation had always been in a good condition.

According to the results of the "Assessment of Radiation Environmental Quality Over the Past 30 Years in China's Nuclear Industry," the average radiation level of the environment within 80 kilometers around the nuclear facilities was just 0.01 percent higher than the level of natural radiation [tian ran ben di zhao she 1131 3544 2609 1646 3564 1410], and the effect on the environment was extremely slight.

In the last 10 years, China's nuclear industry has made substantial progress in the management of radiation waste and the handling of the old nuclear facilities that were no longer in operation. At the same time, marked results were achieved in the establishment of perfect standards and regulations for environmental protection and in the aspect of international cooperation.

The official said: Alongside the achievements, some problems also exist. For example, environmental monitoring was somewhat weakened, the quality of monitoring has declined somewhat, personnel and equipment are aging, the quality of the environment has to be further improved, and the professional quality of environmental protection personnel has to be further enhanced.

Reportedly, environmental protection work in China's nuclear industry is now focused on the handling of waste, and the management of nuclear waste is being strengthened. Laws and regulations will be enforced strictly, monitoring will be strengthened, modern means will be used to improve the process of environmental assessments so that the quality of the work in this regard will be enhanced, procedures will be simplified, the environmental protection industry will develop on a considerable scale, and personnel training will also be strengthened.

Water Saving Efforts Pay Off in Cities

OW0606132694 Beijing XINHUA in English
1305 GMT 6 Jun 94

[Text] Beijing, June 6 (XINHUA)—The emphasis which China has placed on saving water-use in the cities had had good effects, said Ye Rutang, vice-minister of construction.

Since 1983, Chinese cities have saved using 13.9 billion cubic meters of water altogether. The ratio of recycled water used has increased from less than 20 percent in 1983 to 60 percent.

China economizes to save using 1.39 billion cubic meters of water annually, equal to building seven water-works with a capacity of 500,000 cubic meters.

Economizing on water obviously helps to protect China's water resources and city environments, he pointed out.

Waste water which had to be disposed of has decreased by 1.1 billion cubic meters every year through the save-water drive.

Shanghai, Tianjin, Ningbo and other cities have improved their control of earth subsidence by stronger management of utilization of ground-water resources.

China also saves 6.95 billion kwh of electricity every year by cutting water-use, Ye said.

China has 2,800 billion cubic meters of water resources, the sixth greatest in the world. But each Chinese citizen only has 2,440 cubic meters, a quarter of the world average, due to China's large population of more than 1.1 billion.

Figures from the provinces so far available in Beijing show that by the end of 1993, there was water shortage in about 300 cities out of China's total of 570 cities.

To make people conscious of the importance of keeping water-use down, China has set aside the second week in June every year as a period for special publicity on saving water, ye said.

He added that the government has set up a special organization in the Ministry of Construction and branches in most of the cities to coordinate water-saving efforts.

Enterprises Closed Down To Reduce Pollution

HK0606135494 Hong Kong ZHONGGUO TONGXUN SHE in Chinese 0831 GMT 27 May 94

[Text] Beijing, 27 May (ZHONGGUO TONGXUN SHE)—It is learned from authoritative departments that by the end of 1994, 191 enterprises in Henan, Anhui, Jiangsu, and Shandong, will be closed down or merged with other enterprises, or their production will be stopped or changed, to reduce pollution of the Huai He and to keep the water of the river clean.

Mass media here have disclosed that the water of the Huai He valley is seriously polluted and nearly 50 percent of river sections have become useless; in some areas, polluted water has been used to irrigate land over a long period resulting in a decrease in grain output and the content of pollutants in agricultural produce exceeding safety standards; the output and variety of fish and shrimp have decreased; and disputes over pollution between different localities have become more and more conspicuous. In dry seasons, plants often have to suspend production. The shortage of water resources has become more and more serious and control over the Huai He brooks no delay.

A meeting on enforcing laws to protect the environment of the Huai He valley was held in Bengbu, Anhui, from 24-26 May. Besides laws and regulations on prevention and treatment of pollution to be revised this year, provisions concerning crimes in causing pollution will be added. The formulation of "Regulations on Prevention and Treatment of Pollution in the Huai He Valley" is also being discussed.

Environmental Problems 'Coming Under Control'

OW0306065194 Beijing XINHUA in English 0615 GMT 3 Jun 94

[Text] Beijing, June 3 (XINHUA)—Despite China's rapid economic development, the country's environmental problems are coming under control, with only a few regions facing serious environmental pollution, the State Bureau of Environmental Protection said here today.

"Although China is facing increasing pressures from environmental problems as the country has taken energy, raw materials and other basic industries as the top priorities for development, the country has still achieved progress in the control of industrial pollution," the bureau said in its annual report on the country's environmental and ecological situation.

According to the report, in 1993 the amount of smoke and dust released into the air in urban areas remained the same as in 1992.

"The water quality in rivers, reservoirs, underground and offshore remains fine," the report says.

"The country's forests are expanding, and the areas of nature reserves now account for 6.8 percent of the country's total territory," the report says.

"But the volume of mature forest trees which can be logged is shrinking," it notes.

"The degradation, desertification and saltification of grassland are continuing, while the loss of water and soil remains serious," the report adds.

"Over-exploitation of underground water in urban areas is rampant and the deterioration of the eco-environment of the country's fishing industry is yet to be controlled," it warns.

The report blamed coal burning for the air pollution in many of China's cities. "Such air pollution is more serious in winter and in big cities than in summer and small towns.

"In 1993, more Chinese cities suffered from acid rain than in the previous year," according to the report.

Meanwhile, Xie Zhenhua, director of the State Bureau of Environmental Protection, promised, "China will devote more efforts to environmental protection while speeding up economic development."

State Council Issues Circular on Forestry Protection

HK0306084694 Beijing CHINA DAILY in English 3 Jun 94 p 1

[By Wang Yonghong: "Government Urges Better Protection of Forests"]

[Text] Excess logging in recent years prompted the central government to urge all departments and local governments to ban misuse of the nation's forests.

"The annual quota for allowable tree-felling must be strictly observed and all activities involving logging, transporting and processing of wood must be conducted under licences," the government announced.

China's boom in construction and development has led to a worrisome imbalance between logging and new growth in the nation's forests, the statement warned. The supply of mature timber is almost exhausted, it was noted.

Legal and administrative units of the government may not engage in such activities, the government said.

Some inspections will be launched later this year to help implement the Forest Law and relevant regulations, according to the circular issued by the State Council, the country's highest governing body.

All violations of the Forest Law and regulations, such as clear-cutting forests, illegally occupying woodlands and indiscriminate hunting of wildlife, will be severely punished, it said.

Violations rose 16 percent last year, compared with 1992, said an official from the Ministry of Forestry.

Large profits from trading in timber—in short supply on the market—attracted more people and even government departments to engage in the business, noted the official, who declined to be identified.

Some culprits, often armed with weapons, had attacked forest keepers and looted timber from tree farms.

Last year, 31 forest keepers and officials working at timber checkpoints were killed, and another 1,200 were wounded, according to the official.

Booming construction and industrial development zones also consumed large amounts of woodland.

Some local governments, ignoring the Forest Law and relevant regulations, occupied forest-land for other use without approval from authorities or sold woodland at very low prices in order to attract outside investment for industrial development.

As a result, some 450,000 hectares of woodland was lost annually for various kinds of development programme or construction, said the official.

In a bid to curb such unchecked tree-felling and to keep a balance between timber growth and consumption, the central government has since 1987 required licenses and implemented quotas for logging.

Despite such measures, the quota was exceeded every year, the official noted.

Although China has increased its forest coverage to current 13.9 percent from 12.9 percent of national territory five years ago, its mature timber is nearly exhausted, with only about 1.96 billion cubic metres left.

Agency Says Overall Environment Conditions 'Fairly Good'

HK0406053094 Beijing CHINA DAILY in English
4 Jun 94 p 3

[By Zhu Baoxia: "Steps Taken to Clean Up Pollution"]

[Text] The quality of China's environment is fairly good, considering the pressures put on it from the country's rapid economic development.

But in a few places, pollution and other kinds of environmental deterioration have worsened, according to a national report on last year's environmental status released by the National Environmental Protection Agency (NEPA) yesterday.

On a positive note, less waste water was discharged last year. Total waste water discharges amounted to 35.5

billion tons, or 3 percent less than the year before. Industrial discharges accounted for 21.9 billion tons of the total, a 6.2 percent drop over last year.

The volume of solid industrial wastes stabilized at 20 million tons last year.

Meanwhile, more trees were planted, leading to a new total of 133 million hectares of forested land.

But some environmental problems became worse last year.

Emissions of certain air pollutants grew. Soot emissions rose by 7.1 percent, and sulphur dioxide, which causes acid rain, went up by 6.5 percent.

All waste gases last year totalled 11 trillion cubic metres.

The worse places for air pollution due to coal burning were found in the bigger cities of north China during the winter and spring.

The extent of acid rain did not expand much but it was found more frequently in the southern cities, including Jiangxi Province's Ganzhou, Changsha of Hunan, Chongqing of Sichuan, and Hangzhou of Zhejiang.

Atmospheric pollution has become one of the major causes of respiratory diseases such as chronic bronchial pneumonia and lung cancer. The mortality rate of lung cancer in cities was 34 per 100,000 people, a rise of 18.5 percent over 1988.

Among farmers, respiratory ailments have become the number-one killer, with a death rate of 165 per 100,000.

The report also said that the urban stretches of big rivers and some lakes were seriously polluted.

Noise pollution has also worsened, mainly due to crowded urban conditions, traffic, and industry.

Last year, over 2,700 industrial pollution cases were reported throughout the country, an increase of 94 cases over the previous year, causing an economic loss of over 220 million yuan (\$25 million).

More than 10 million hectares of farm land were polluted, reducing grain harvests by 12 billion kilograms.

There were 107 large-scale geological disasters such as land collapses, land-slides, and mud flows, claiming 432 lives.

The report noted progress in some areas, however. The disposal rates of waste gases, water, and solids have been raised. And more people have the benefit of central heating and piped gas.

By the end of last year, 766 natural reserves had been set up, taking up 6.8 percent of the country's total area.

Preservation centres for endangered animals were established in Sichuan, Shaanxi, and Guangdong Provinces and Guangxi Zhuang Autonomous Region. Over 300 wild animals have been put under State protection.

Xie Zhenhua, NEPA administrator, said that the country's challenges for the future are to improve its energy efficiency, control greenhouse-gas emissions and industrial and urban pollution, and develop new technology to protect the environment.

CHINA DAILY Commentary Greet 5 June World Environment Day

HK0406060094 Beijing CHINA DAILY in English
4 Jun 94 p 4

[CHINA DAILY Commentary: "Environmental Defence"]

[Text] Tomorrow (June 5) is World Environment Day. It is a day aimed at increasing people's awareness about the importance of environmental protection around the globe.

China, with its vast territory and large population, has a duty to keep the air fresh and water clean in this part of the world.

Back in 1973, China convened its first national conference on environmental defence. In the early 1980s, environmental protection was made a basic concern of the State. Since then China has paid close attention to environmental protection while developing its economy.

Over the last 12 years the economy has grown rapidly yet its environment has not deteriorated. This has brought great benefits to the people.

Realizing the importance of a concerted effort in the battle to protect the environment, China has forged close relations with relevant world bodies.

In response to the call of the Earth Summit, held in Rio de Janeiro in 1992, China published a white paper earlier this year entitled: "Population, Environment and Development in the 21st Century." Dubbed "Agenda 21," the proposal lists 63 projects, including the cleaning of smokestacks, saving farm land from soil erosion, protecting endangered species, and the development of sustainable oil reserves.

In February, China endorsed three international resolutions banning the disposal of radioactive and industrial wastes at sea.

Laws and regulations have been adopted, creating a legal framework for environmental protection.

The Chinese Government has vowed to further strengthen legislation and increase investment in this regard to help bring about sustained economic development.

Spending on environmental protection is to be raised from the current 0.7 percent of the gross domestic product (GDP), or 20 billion yuan (\$2.3 billion), to 1 percent of GDP by the year 2000.

Like other developing countries, China still has a long way to go before radically improving its environment.

Despite efforts made, factories in China are discharging 6.85 million tons of sulphur dioxide annually, the second highest amount in the world. Six billion tons of solid waste

are piled up across the country and soil erosion caused by the misuse of land affects almost 20,000 square kilometres a year.

Because many people continue to be indifferent to environmental defence, laws and regulations are often not implemented and in some cases simply ignored by some local authorities. This is one of the main problems faced by those carrying out China's environmental protection work.

A tightening-up of the issue is needed. Enterprises which actively treat their pollutants should be commended while those who refuse to do anything about it should have their operations shut down and their management fined.

In its bid to protect the environment, China has received foreign help. In the past decade, the World Bank, the Asia Development Bank, and global environmental foundations have provided over \$1 billion in grants or low-interest loans to finance China's environmental protection projects.

Such help is much appreciated.

As envisaged by "Agenda 21," industrial pollution in China will be completely controlled by the year 2000. Such an achievement will be an important contribution to the world. And China will not relax until it has succeeded in its task.

Report on Communiqué on Environmental Conditions

OW0406210994 Beijing XINHUA Domestic Service
in Chinese 0751 GMT 3 Jun 94

[Report by Yu Changhong (0060 7022 3163)]

[Text] Beijing, 3 Jun (XINHUA)—What were China's environmental conditions like last year? The "Communique on China's Environmental Conditions" issued by the State Environmental Protection Bureau today says: Under the circumstances of a fairly rapid economic development in 1993, environmental conditions were relatively more stable. Environmental pollution and damage to the eco-environment were still continuing. A small number of areas were seriously polluted, whereas pollution in some areas was brought under control. The eco-environment was turning for the better.

According to the regulations of the "Environmental Protection Law of the People's Republic of China," the State Environmental Protection Bureau will issue a "communique on China's environmental conditions" for the previous year on the eve of 5 June—World Environment Day—every year after 1990. Since the United Nations convened the Congress on Environment and Development, the Chinese Government has paid much more attention to coordinated development of the environment and the economy, adopted the strategies for sustained development, and put forward a series of countermeasures and measures on environment and development. Environmental conditions around the country are stable as a whole.

The communique issued today notes: Air pollution caused by smoke from burning coal is still very serious in cities—it is more serious in winter and spring than in summer and fall, in north China than in south China, and in medium and big cities than in small towns. The discharge of sulfur dioxide and industrial dust has increased to some extent, and acid rain has been found in more cities than in the previous year.

In 1993, water pollution found in rivers around the country was a kind of organic pollution. Water quality in mainstreams was better than in tributaries, and rivers passing through cities were more seriously polluted. Over exploitation of underground water was rampant in cities, and the deterioration of the eco-environment of the fishing industry had not been brought under effective control yet. The degradation, desertification, and salinization of grasslands continued, and the volume of mature forest trees which could be logged was shrinking.

Concerning the work of environmental protection in 1993, local people's governments at all levels and various departments under the State Council have intensified their work and extensively launched inspections of the enforcement of the environmental protection law under the guidance of the CPC Central Committee and the State Council and have made achievements in preventing and controlling industrial pollution. The amount of smoke and dust released into the air in cities remained the same as in 1992. The water quality in mainstreams of big rivers, inland rivers, large-sized reservoirs, underground water in cities, and most offshore waters remained fine. Municipal and public facilities were further improved; progress was made in declaring and registering discharged pollutants; control over dumping at sea was further strengthened.

In 1993, people around the country have further enhanced their environmental concepts, and environmental campaigns with the participation of the public were larger and more diversified than in the past. Environmental education was more popularized.

The 1993 "Communique on China's Environmental Conditions" is jointly compiled and completed by the Ministry of Agriculture, Ministry of Forestry, Ministry of Water Resources, Ministry of Geology and Mineral Resources, Ministry of Construction, Ministry of Public Health, State Statistical Bureau, State Meteorological Administration, State Oceanography Bureau, State Land Administration Bureau, and State Environmental Protection Bureau.

Endangered Plants Well-Protected in Southwest

OW0506080594 Beijing XINHUA in English
0750 GMT 5 Jun 94

[Text] Kunming, June 5 (XINHUA)—Chinese scientists have succeeded in artificially cultivating 108 species of endangered plants in southwest China's Xishuangbanna Tropical Botanical Garden.

Located in Yunnan Province, Xishuangbanna is the only vast area of tropical forest in China. It covers an area of 19,000 sq km. It also boasts one sixth of the species of seed plants and pteridophytes in China. In 1959 the Chinese

Academy of Sciences set up the tropical botanical garden, the first of its kind in the country.

Because of human activities leading to deterioration of the environment, the tropical forests at Xishuangbanna have shrunk by 50 percent in the past five decades. Many species of plants are on the verge of extinction.

In 1984 the tropical botanical garden set aside 80 ha of land to cultivate the endangered species. After years of research and experimentation the garden has succeeded in cultivating 108 species of endangered plants, including 46 species that were listed among the 53 major species of plants under state protection.

Many of these plants date back to the tertiary period and are considered as living fossils.

In order to better study and protect the endangered plants, the tropical botanical garden is preparing to set up a bank of seed genes of tropical plants.

Tenggeli Desert's Endangered Wild Life Center To Expand

OW0606034394 Beijing XINHUA in English
0136 GMT 6 Jun 94

[Text] Lanzhou, June 6 (XINHUA)—Two wild horses are due to be born at a breeding farm in the north-west desert—good news for the species at the brink of extinction worldwide.

There are only 900 of this breed of horses left all over the world, according to a report from the International Wild Horse Association.

The two pregnant mares are being taken care of in Gansu Province by the endangered wild life breeding center, which lies in the heart of the Tenggeli Desert.

Years ago the wild horse almost became extinct in China—its original birth place. The rescue work started in 1988 when the center imported ten horses from the United States and Germany. Now altogether 16 horses live in this desert, which has nearly half of its area green-covered.

Other wildlife, such as saiga antelope, Asiatic wild ass, takin, wild camel, gold-haired monkey and white-lipped deer, have also found their paradise here.

In the monkey village, the youngest is only one month old while the oldest is the 13-year-old king.

The breeding center will be extended to 6,600 hectares this autumn.

Women's Federation Marks Environmental Day in Beijing

OW0606043894 Beijing XINHUA Domestic Service
in Chinese 0833 GMT 5 Jun 94

[By reporter Zhu Youdi (2612 1635 2769)]

[Excerpt] Beijing, 5 Jun (XINHUA)—The first meeting on Chinese women and the environment was held today at the Great Hall of the People in Beijing in conjunction with a meeting to mark the "June 5th" World Environment

Day." Addressing the meeting, State Councillor Song Jian called for increasing society's awareness of the environment, stepping up propaganda and education, and fostering environmental ethics. He urged every woman to enthusiastically take part in the great cause of developing the economy and protecting the environment and to create a better tomorrow with concerted efforts.

The meeting was jointly sponsored by the State Environmental Protection Bureau and the All-China Women's Federation with a view to enhancing, among the broad ranks of women, the understanding of environmental problems, increasing their environmental awareness and enlisting their participation in the environmental cause and in advancing China's environmental undertakings. Song Jian said: Women play an irreplaceable role in the modernization drive. Mothers exercise the most direct influence on the youngsters and children—the future of society. We must build such a consensus in society; that is, polluting the environment is a behavior that runs counter to social ethics and the standards of the law and infringes upon the fundamental interests of the broad masses of the people and future generations. Participation of tens upon millions of women in the cause of economic development and environmental protection will have a major impact on the family, society, and, in particular, the youngsters and children.

Cheng Siyuan, National People's Congress Standing Committee vice chairman, and Qian Zhengying, National Committee of the Chinese People's Political Consultative Conference vice chairman, were present at the meeting and spoke. [passage omitted on units and individuals honored at the meeting]

Local Authorities Urged To Enforce Environmental Laws

HK0606081494 Beijing CHINA DAILY in English
6 Jun 94 p 1

[By Zhu Baoxia: "Polluters Warned of Criminal Penalties"]

[Text] In the latest move to stem pollution at its source, the central government is urging local authorities to take stern legal and economic action against violations of State environmental laws and regulations.

Individuals and companies that pollute the environment will face economic penalties, and serious cases must be prosecuted, said Song Jian, State Councillor and Director of the State Council's Environmental Protection Committee yesterday in Beijing.

In a speech marking World Environment Day, Song pointed out that the discharge of pollutants into the environment violates both public ethical standards and State laws. It harms the basic interests of all people and their offspring. He said it was a crime similar to smuggling narcotics or marketing fake medicine.

Song stressed that environmental protection must be based on legislative administration accompanied by scientific and technological advancement and economic development.

He also urged greater publicity to raise environmental awareness.

One step in this direction will be taken on Wednesday, when nine government ministries will jointly launch a TV programme of lectures on China's environmental legislation at China Central Television Station, Song said.

Commemorative activities were held throughout the country on the global day, whose theme was "one earth, one family."

The Zhongwei Sand-Fixation Forest Farm in Northwest China's Ningxia Hui Autonomous Region received national focus, since it was honoured as one of the "global 500" projects by the United Nations' Environment Programme (Unep).

Since 1987, 16 individuals and units in China have won the title, which commemorates contributions to environmental conservation.

For the past three decades, the farm has successfully protected the railways from Baotou in the Inner Mongolia Autonomous Region to Lanzhou in Gansu Province. In addition, it has turned 280,000 hectares of desert and sandy land into oasis and farmland.

The forest farm's techniques have been copied in other provinces and autonomous regions, as well as foreign countries.

Also yesterday, the National Environmental Protection Agency (NEPA) and the All-China Women's Federation jointly sponsored a national meeting on Women and the Environment in Beijing.

One hundred women were praised for their contributions and achievements in the country's environmental protection work.

Participants drew up a National Environment Declaration for Chinese Women, which called upon women throughout the country to devote themselves to global action against pollution and to preserve the ecological balance.

The declaration says that Chinese women—comprising one-tenth of the world population—should take responsibility for the sustainable development of the global environment.

The day also featured the opening of a three-day China-United States seminar on environment surveillance administration and technology.

Shanghai's Local Environment Improves

OW0606082494 Beijing XINHUA in English
0801 GMT 6 Jun 94

[Text] Shanghai, June 6 (XINHUA)—The environmental quality at Shanghai's Xinhua Street area, notorious for industrial pollution, has been greatly improved thanks to a ten-year effort.

The 2.2-square kilometer area in the western part of the city houses 110 plants involved in industrial chemicals, medicine, paper-making, tool-making, machinery and electrical appliances, and more and instruments, which discharge heavy pollutants such as water and gas.

Since 1985, the municipal government has spent 450 million yuan in the treatment of pollution in this area, which has completed 407 pollution-treatment projects and removed, closed down or merged 25 plants and workshops discharging heavy pollutants. The municipality has also planted more trees, bushes and flowers.

As a result, the industrial output value of the area last year went up by 33 percent over 1985 and the amount of discharged waste gas was reduced by at least 70 percent and waste water by 50.7 percent.

Noise in the area does not exceed the municipal government-set standard at present.

Xiamen Not To Sacrifice Environment for Economic Benefits

OW0606082594 Beijing XINHUA in English
0806 GMT 6 Jun 94

[Text] Xiamen, June 6 (XINHUA)—Xiamen will never sacrifice the environment for economic benefits, Hong Rongshi, mayor of the special economic zone in east China's Fujian Province, said today.

A city whose population has doubled and whose economy has grown more than twelve-fold, Xiamen has maintained its environmental level as it was a decade ago, and has built a series of pollution control projects.

Known as a seaside resort, Xiamen has allocated its island, mainland and suburbs different industries for attracting overseas investment, so as to attain simultaneous development of economy and environment.

The city is now a major attraction for overseas investment and for Chinese and foreign tourists. Its air pollution is under control and its water quality is among the country's best.

Zhejiang Top Environmental Protection Province

OW0606085794 Beijing XINHUA in English
0844 GMT 6 Jun 94

[Text] Hangzhou, June 6 (XINHUA)—East China's Zhejiang is the country's top province as far as environmental protection goes.

It tops the list when it comes to environmental quality, and its forest coverage rate is 46 percent, also one of the highest rates in China, according to an appraisal of environmental quality made by the ecologic research institute of the Chinese academy of sciences.

In recent years, with the development of township enterprises, environment pollution has increased accordingly, and the provincial government has formulated regulations to deal with the problem, according to a recent forum to

mark world environment day sponsored by the provincial environment protection bureau.

For example, while promoting silkworm breeding and fruit production, the provincial government decreed regulations concerning fluorine pollution. In addition, to ensure the purity of the water used in making the famous local Shaoxing rice wine the provincial legislature enacted a set of regulations to protect Jianhu Lake.

The local government has also emphasized controlling the pollution caused by township enterprises engaged in printing, dyeing, tanning, chemical engineering and paper-making.

The province has set up various kinds of nature reserves and scenic resort areas to protect rare animals and plants, natural scenery, water, and cultural relics.

UN Grant Used To Build Ship Sewage Treatment Plant

OW2905130794 Beijing XINHUA in English
1153 GMT 29 May 94

[Text] Shanghai, May 29 (XINHUA)—Construction of the Shanghai ships' sewage treatment plant, financed largely by a grant from a United Nations fund for global environmental protection and loans from the World Bank, has just started.

Local officials said Friday [27 May] that the project will cost 120 million yuan (about 13.79 million U.S. dollars), of which 4.31 million U.S. dollars will be covered by donated money from the U.N. fund and another 6.23 million U.S. dollars will be covered by World Bank loans.

The plant will be built and managed by the Shanghai Maritime Transport (Group) Co. The plant at Waigaoqiao, Shanghai, will have a 300m waterfront, with a dock to handle ships with 35,000 dead weight tonnages. It will be equipped with modern greasy dirt and sewage treatment facilities.

The whole project is expected to be finished in 1995. By then, the plant will help treat 400,000 tons of greasy dirt and sewage and 100,000 tons of water polluted by chemicals a year.

Construction of similar environmental protection projects has also started in five other port cities: Dalian, Tianjin, Ningbo, Xiamen and Guangzhou.

The building of the projects in these six ports will involve use of a total of 30 million U.S. dollars of donated money from the U.N. fund and 15 million U.S. dollars of loans from the World Bank.

Natural Resources Study Center To Be Set Up

OW3005084694 Beijing XINHUA in English
0814 GMT 30 May 94

[Text] Nanjing, May 30 (XINHUA)—A center to study and develop south-east China's natural resources is to be set up on 31 May in this capital of Jiangsu Province, east China.

The center will focus on the study of the natural resources, environment, natural disaster dangers and development of south-east China's coastal areas and the Chang Jiang River valley.

It will set up an information bank about natural resources and the environment and a satellite ground station to receive information about the earth natural resources and the ocean.

Founded by the Nanjing branch of the Chinese Academy of Sciences, Nanjing University and Hehai University, the center will employ more than 2,500 scientific and technical personnel. It will also serve as a base to train and bring about skilled people.

Ministries Ban Harmful Projects, Encourage Recycling

HK0106154394 Hong Kong LIEN HO PAO in Chinese
1 Jun 94 p 22

["Special dispatch:" "Three-year Ban on Six Kinds of Projects by Mainland"]

[Text] Beijing, 31 May—The Ministries of Construction and Domestic Trade have stated that they will ban the launching or expansion of projects for the following products due to overproduction and shortages in raw materials: Aluminium-alloy windows and doors, plastic wallpaper, man-made marble, terrazzo, plastic product processing, and mini-vehicles. Beijing has decided to freeze projects on the above products for the next three years.

Meanwhile, Beijing will encourage projects for the following products by means of preferential policies: The production of steel from scrap iron; the extraction of metals from nonferrous metal scrap, solvents, and discarded parts; the extraction of nonferrous metals from cast-away plastic pieces, toothpaste tubes, and used light bulbs, batteries, and fluorescent light tubes; the making of recycled paper and paper products from rags, hemp, flax, cotton, and paper; the recycling of chemical fibre waste, scrap glass, and plastic and raw material waste; and the production of recycled rubber and rubber powder from rubber waste.

Circular Urges Protection of Forest Resources

OW0106160894 Beijing XINHUA in English
1547 GMT 1 Jun 94

[Text] Beijing, June 1 (XINHUA)—China has vowed to strengthen the protection and control of the country's forest resources, according to a circular issued by the State Council recently.

According to the circular, the country's timber consumption climbed, and the cut in some localities was on the rise.

In response, the circular urged governments at all levels and relevant departments to pay special attention to the protection and management of forest resources, saying that the limit on timber cuts and transport licensing system should be enforced strictly.

Also, and the management of forest areas and the protection of wildlife and rare plants should be considered an important duty of local authorities, said the circular, noting that those caught destroying the forests will be punished severely.

State Council Issues Circular on Protecting Forests

OW0206045094 Beijing XINHUA in Chinese
in Chinese 2111 GMT 31 May 94

[Text] Beijing, 1 Jun (XINHUA)—The State Council's General Office recently issued a circular on improving the protection and management of forest resources. The circular said: In recent years, various localities have made new headway in accelerating the pace of afforestation and greening, and in improving the protection of forest resources. Some new problems have arisen in our forestry sector, however. Chief among them are an increase in the excessive consumption of forest resources, the rather serious problem of logging in excess of authorized quotas, and the renewed practices of indiscriminate felling and logging trees and of recklessly capturing and hunting wildlife. People's governments at all levels and all relevant departments should take these problems seriously, and they should earnestly study ways to solve them.

In the circular, the State Council's General Office said emphatically: Although our country has achieved growth in both forested areas and forest resources, it is still deficient in forests, with declining timber stocks and decreasing forest resources. People's governments at all levels should take forestry-related work seriously. We should make use of all economic and legal means to adopt administrative measures which are conducive to the improvement and development of forest resources, and develop sound means of protecting and managing forest resources.

First, we should strictly implement the system of logging quotas and timber transportation based on transport documents. Annual logging quotas which are approved by the State Council for prescribed periods, and the maximum consumption amounts for various regions. When they exploit forest resources, they are under no circumstances may surpass the quotas without the approval of the State Council or other authorized units. In the second half of 1994, all localities should extensively review the progress of recent years in enforcing logging quotas, and strictly deal with units that exceed logging quotas. We should continue the policy of allowing forestry departments to exercise unified management and purchase timber into the mountains to buy timber from key timber-producing counties, and may not willfully abolish timber inspection stations established in accordance with the law. Railways and transportation departments should maintain the system of transporting timber based on relevant documents. Administrative organs and law enforcement departments are strictly forbidden to run logging operations under various pretexts and in various forms.

Second, we should tighten supervision and management over woodland utilization and implement the system of compensated woodland utilization. Units and individuals

which have not attended to relevant procedures in accordance with the law may not, under any pretext, occupy or allot for free utilization woodland which is used by state-owned forestry enterprises and institutions. Forestry rights certificates are legal documents attesting to ownership rights to forests, timber, and woodland. People's governments at all levels should review illegal woodland appropriation and occupation since the second half of 1992; set deadlines for attending to procedures for examination, approval, and compensation; and retake illegally appropriated and occupied woodland upon failure to complete such procedures.

Third, we should conscientiously improve the protection and management of wildlife and rare plants. People's governments at all levels should take wildlife and rare plant protection as their important duty, institute an on-the-job responsibility system, and implement various protection measures.

Fourth, we should improve forestry administration and basic services regarding forest resources, and stabilize the forestry-related law-enforcement ranks. People's governments at all levels, particularly county-level forestry departments, should place a premium on basic services such as forest resource protection and management. They should stabilize the ranks of managerial and law-enforcement personnel for forestry administration, forestry-related public security, timber inspection stations, and forestry work stations. They should actively solve practical staffing and funding problems, and foster good working conditions for such personnel.

Fifth, we should sternly combat all kinds of illegal and criminal activities which destroy forest resources. People's governments at all levels should take resolute measures against, and devote special efforts to cracking down expeditiously on, illegal and criminal acts committed by various people's governments to pilfer and clandestinely log trees owned by the state and collectives; to occupy woodland illegally; to hunt, smuggle, and trade illegally in wildlife and allied products which are on the state's priority protection list; to damage rare plants; and to beat up and injure forestry-related law-enforcement personnel.

Sixth, we should uphold the responsibility system based on tenure-specific objectives under which leading cadres protect and develop forest resources. Forest resource protection and management are an important duty of people's governments at all levels. We should take the growth and depletion of forest resources as one of the criteria against which to evaluate the performance of leaders at all levels, especially those at the county and township levels. We must investigate the responsibility of key administrative leaders if they have caused heavy losses through their failure to effectively halt the practices of indiscriminately felling and logging trees, illegally occupying woodland, and recklessly capturing and hunting wildlife while they are in office. We should commend and reward those who have achieved remarkable results in protecting, nurturing, and developing forest resources.

Guangzhou Strengthens Environmental Protection

HK0206114194 Beijing ZHONGGUO XINWEN SHE
in English 1018 GMT 2 Jun 94

[Text] Guangzhou, June 2 (CNS)—According to the Bulletin of Environmental Protection, environmental pollution in Guangzhou is by and large under the control. However, measures curbing pollution in the city are still inadequate, in view of the growth of pollution.

Though industrial pollution is initially under the control, environmental pollution is still rather serious. For instance, organic contamination in the water of the Guangzhou part of the Pearl River is getting worse. Disposal of urban refuse is still a headache. Harmful industrial rubbish has not yet all been collected together to be disposed of. Growth of the number of motor vehicles is too fast, and their exhaust gas resulting in polluting the air. Noise pollution along the sides of main traffic lines remains high. Environmental administration over the tertiary industry is lagged behind its development. Urban residents are seriously suffering from waste water, waste gas and noise caused by the food industry there. Some enterprises are still shifting their responsibility of curbing their own pollution to society, aiming at making profit at the expense of people there.

According to an official from the Guangzhou Municipal Environmental Protection Committee, Guangzhou would be built into a metropolis of international standard in five years time, and 1994 is a crucial year for the realization of the goal. Protection of environment must keep up with the development of economy. The plan for the protection of environment must be worked out in conformity with the total urban construction plan and the plan of municipal economic development. Departments of Urban construction, municipal administration, environmental protection and public utilities must take effective measures to speed up construction of projects for disposal of waste water and urban refuse, strengthen administration over and harness motor vehicles' exhaust gas, strengthen supervision over environment of food industry and control motor vehicles' noise pollution so as to improve environment for people's living. At the same time, Guangzhou municipality will further improve its laws and regulations on environment, endeavor to make publicity of the importance of environmental protection so as to enhance people's understanding of environmental protection.

World Bank Provides Loan To Combat Loess Plateau Erosion

OW2805064494 Beijing XINHUA in English
0550 GMT 28 May 94

[Text] Washington, May 27 (XINHUA)—The World Bank today approved a credit of 150 million U.S. dollars to help restore China's heavily eroded loess plateau and lift 1.2 million people out of poverty.

The bank said that soil erosion has made China's loess plateau "something like the surface of the moon," and that per capita income there is only about 35 to 50 dollars a year.

The bank said the project seeks to tackle the issue of poverty and the environment at the same time and is expected to increase grain production by 50 percent and fruit production by 400 percent.

"The little rainfall the people get will be kept for crops and trees, where now it just runs off," said the bank's project manager Juergen Voegelé.

"They will also be able to convert highly eroded areas to production, utilize river beds and move away from unproductive and unsustainable planting on sloping hillsides," he said.

The total cost of the project is close to 250 million dollars.

Song Jian Discusses Cleaning Up Huai He

OW2805073194 Beijing XINHUA Domestic Service
in Chinese 0859 GMT 26 May 94

[By reporters Zhu Youdi (2612 1635 2769) and Kong Xiangying (1313 4382 6601)]

[Text] Hefei, 26 May (XINHUA)—An on-the-spot meeting sponsored by the State Council Environmental Protection Committee on reviewing the law enforcement of environmental protection in the Huai He basin concluded in Bangbu, Anhui, today. During the meeting, a plan for controlling water pollution in the Huai He basin was adopted, ushering in a massive effort to control pollution there.

State Councillor Song Jian, who is also in charge of the State Council Environmental Protection Committee, said that it is necessary to take economic, administrative, and legal measures to control the Huai He's pollution within a set time so as to achieve the goal of making the Huai He clean by the end of this century.

During the meeting, leaders from four riparian provinces along the Huai He—Henan, Anhui, Jiangsu, and Shandong—as well as responsible people of relevant state ministries and commissions adopted a plan for pollution control in the Huai He basin after carefully analyzing the river's pollution and control situation. To control Huai He pollution, the following efforts will be made: The State Council Environmental Protection Committee and the Water Resources Ministry will take the lead in forming a Huai He water quality control organization, with the participation of Henan, Anhui, Jiangsu, and Shandong and relevant State Council departments. The organization will be responsible for coordinating and planning the overall control of the Huai He's pollution. A Huai He water quality pollution control monitoring network will be established and improved to conduct dynamic monitoring of the river's mainstream and all major tributaries and carry out a target and comprehensive control of pollution in all of its sections. A group of enterprises along the Huai He whose pollution is severe and hard to control will be closed down, suspended, merged with other enterprises, or their product lines changed in three years. The first batch of enterprises whose pollution is severe and whose economic performance is poor will be closed down, suspended, merged with other enterprises, or product lines changed

this year. In addition, 200 control projects will be accomplished in three years. By 2000, all riparian cities and counties along the river must build water pollution treatment facilities suitable to local conditions. It is necessary to formulate relevant laws and regulations concerning the control of the Huai He's pollution to put the control work on a legal track. The meeting urged the four riparian provinces to carry out and accomplish the control plan included in the "Eighth Five-Year program." Any construction projects that might cause severe pollution will be banned in the future.

State Councillor Song Jian said: In controlling the Huai He's pollution, it is necessary to have a resolute attitude and action and carry out the work in a planned and systematic way. In this way, we can achieve practical results. We will never leave the polluted Huai He to the next century. Riparian local governments at all levels should conscientiously strengthen their leadership and supervision and inspection. They must carry out the water pollution control plan. They must clearly define their responsibility and achieve their goals within the set time. Any units that are slack in carrying out pollution control measures or shift their responsibility onto others and cause bad consequences will be criticized in circulars. If a case is serious, their leaders shall be investigated and affixed the responsibility for it.

Song Jian said: In controlling the Huai He's pollution, it is necessary to adhere to the principle that "polluters are responsible for cleaning up." Through the cleaning-up process, it is imperative to help cadres and people living along the Huai He foster a sense of importance to protect the environment. We should establish a new norm of social behavior that is beneficial to the environmental protection. The drive to control the Huai He's pollution is China's first attempt to clean up the whole basin of a river that flows through several provinces. This will be a giant project involving a wide stretch of areas and many people. Under the leadership of the CPC Central Committee and the State Council, we should mobilize leaders at all levels and the broad masses of the people to actively participate in the work. We should launch a joint effort to control pollution in the Huai He. We must make the Huai He clean again in this century and provide experiences and methods for the drive to clean up other transregional rivers in China.

Policy To Protect Cultivated Land Environment

94WN0191A Beijing ZHONGGUO HUANJING BAO
[CHINA ENVIRONMENTAL NEWS] in Chinese
23 Dec 93 p 3

[Article by Peng Keshan 1756 3784 3790]]

[Text] Land is the mother of wealth, and it is the basic building block for human existence and development. It is China's fundamental national policy to treasure and tend every inch of the land and especially to protect arable lands. But, China's land environment has been deteriorating for many years, and the question of how to deal with it becomes more critical every day, as it directly affects

agricultural development, and by extension, the stability of the society, the economy, and the government. How to tackle the many issues of the land environment is a new task facing social workers and the labor force, and the preeminent requirement for economic growth and stability is the protection of agricultural lands.

The Present Situation

There is only .086 hectare of cultivated land per person in China, one-third of the world average of .32 hectare. Less than one in ten of all the fields of the 95.7 million hectares of cultivated land have high and sustainable productivity, and there are 15 million hectares of low-productive, saline-alkaline, marshy, frigid, red-earth, water-eroded, sand-blown, arid, and coastal beach lands. Cultivated land is becoming a scarce resource, and this has not been given sufficient attention or has been overlooked for a long time. In the 20-year period from 1957 to 1977, 29.3 million hectares of arable land have been used for various kinds of construction or abandoned to waste, while 17.3 million hectares have been brought under cultivation, a net loss of 11.2 million hectares, equivalent to the sum of the cultivated areas of Guangdong, Guangxi, and Sichuan, an average loss per year of the total cultivated land in Fujian. From 1978 to 1990, 307,000 hectares of cultivated land disappeared. According to international standards, the danger point is reached when cultivated land is reduced to .053 hectare per person, and China's is presently at .086 hectares per person. Among the 26 countries with the highest ratio of cultivated land to population, China places 24th, and with the population increasing at a rate of 16 million per year, having reached 1.16 billion by 1 July 1990, will top 1.3 billion by the end of the century. Adding on to that a loss of 11.8 million hectares to capital construction in urban and rural areas, in time, when cultivated land averages .0667 hectare per person overall, many provinces will range between .047 and .053 hectare, and the danger point will have been reached, and that is the situation that China is facing in its agricultural development. Even though there are still 13 million hectares of feral land, it is distributed over the frontier, and it is of poor quality, and it is not easily brought under cultivation without high investment. Arable lands that has been taken over in recent years are good fields and flatlands located around towns and cities, which further reduces the land-to-people ratio of arable land resources. This is the situation China faces nationwide, while at the same time wanting the country to be rich, the people strong, and the quality of life to be steadily rising, and China is thus presented with a dilemma and a formidable task.

The Problems

The deterioration of land environment is the result of the disappearance and degradation of land caused by various kinds of natural and social activities which leads to the loss of and damage to the land environment. There are six primary manifestations.

(1) Hundreds of Thousands of hectares of Arable Land Disappear Every Year.

The old pattern of ever expanding arable land in China reversed itself in 1957, and the downward trend has been getting worse day by day. Since 1978 the annual loss has been as high as 307,000 hectares. The primary causes are as follows:

1. The demand for living space is increasing. With steady increase in farm incomes and reduction in the size of farm families, old farm dwellings are being repaired and new ones built, and rural villages are constantly expanding. Investigations have found that in the 4 years from 1985 through 1988, 277,000 hectares of farm land have been taken up for the construction of farm dwellings, and one-third of all the farm land in the country has been taken for construction of every kind. In 1990, 24,000 hectares of land was converted to farm dwellings, and the area of village housing grew, and as living space encroached on the surrounding farm land, arable land disappeared day by day.

2. Capital construction is swallowing up the land. Economic growth since 1978 has caused a boom in capital construction to improve the economic and investment environment on every level and by any means, and a lot of land has been taken out of agriculture; and because of reckless and incautious land management operations, many construction units are grabbing land for use later or taking land they don't use, and a lot of it is good land in cities towns and villages. Besides that, there is a fever from top down for building roads, for village and town enterprises, city construction, real estate, and for opening up zones, are all important factors in the disappearance of farmland. In 1992 alone, 1.33 million hectares were taken up for development zones and real estate.

On top of that, unprocessable trash occupies up to 80,000 hectares of farmland throughout the country.

(2) Soil Fertility is in Decline.

Soil fertility is an important indicator of land quality. The long history of heavy use and little replenishment has caused a steady drop in soil fertility levels, and that is an important factor in ruination of the land environment.

1. The organic quality of soils is declining. The amount of organic content is important to improving the structure and permeability of the soil. In recent years there has been an evident drop in the organic quality of the soil around the country, which reduces the soil quality. Investigation of 1,403 Counties in 1986 showed that the overall ratio of agricultural fields of mid- to low-levels of productivity had increased from 60 percent to 80 percent, and 11 percent had organic measures of less than .6 percent.

2. There is a deficiency in nitrogen, phosphorus, and potassium. According to incomplete statistics, 59 percent of China's arable land is phosphorus deficient, 23 percent lacks potassium, and 14 percent is lacking phosphorus and potassium.

3. Fewer areas are using organic fertilizers for crops. The use of chemical fertilizers is increasing and many farmers are overlooking the value of organic fertilizers, reducing the amount of land for crops, and narrowing the range of soil fertility sources. Neglecting to store up organic fertilizers or to make compost, has turned a lot of farmland into "sanitary fields".

(3) There is Serious Soil Pollution.

In the wake of human activity and environmental change, especially in the last 10 years, industrial pollutants (the 3 wastes), and the use of chemical fertilizers and pesticides in agriculture has been damaging to the land ecological environment.

1. Industrial wastes, "the 3 wastes". There are about 10 million hectares of farmland now being polluted by the "3 wastes" and 907,000 hectares of farmland are polluted by agricultural chemical products, the discharge of the "3 wastes" is greatly increased by the rapid development of industry, and much land around industrial and mining enterprises is polluted and farmland is deteriorating.

2. Chemical pesticides. Spraying of large volumes of chemical pesticides also causes soil pollution. Between 12.7 million and 16 million hectares of China's farmland is polluted by pesticides. According to findings by the Ministry of Agricultural, the residue levels of "666" in the topsoil is .72 mg/kg, DDT is .42mg/kg, and in many areas non-biodegradable residues of organic chlorine pesticides in the soil are increasing annually. Many economically developed areas are also experiencing fairly high levels of soil pollution because the use of chemical fertilizers in increasing and they are being improperly used.

3. Acid Rain. The discharge of large volumes of industrial gases and dust is causing acid rain in many areas. The State Meteorological Administration has found that the acidity of precipitation is on a strong upward trend, acid rain is evident in 20 provinces, cities, and autonomous regions, 2.7 million hectares of farmland are now being polluted by acid rain, and this alone is costing 2 billion yuan in losses to agriculture. Precipitation in Chongqing has an annual average pH level of 4.12, and the acid rain level is up to 90 percent. The soil there is clearly acidified.

(4) Soil Erosion

Soil erosion in unlevel terrain can readily cause damage to topsoil, soil nutrition, and reduce the quality of topsoil. China is among those countries in the world that have serious erosion problems. According to the mid-December issue of the Chinese Science Daily, 3.75 million square kilometers of land is being eroded away, and since Reconstruction, four-fifths of the land suffering from erosion has yet to be brought under control, and in controlled areas, for every residence that has been brought under control there are many that have not, and the trend is for erosion to spread more every year.

(5) Spreading Sands

Sand is spreading over the land at a much faster rate than it is being brought under control, 24.2 percent of the

national territory is desert, and 18.3 percent is turning into desert, and 47.3 percent has the potential for becoming desert. Yellow sand damage spreads at a rapid rate of 4.93 million hectares per year. About 10 million hectares of arable land and grassland are in danger of being overcome by sand, and every year another 133,000 to 200,000 hectares are damaged and disappearing.

(6) The Frequency of Natural Disasters

Between 1949 and 1990 there have been over 40,000 geological disasters, and over 2,000 have caused major damage; 405,000 human lives have been lost, over 1 million people injured, and economic losses amount to 10 million yuan. Over 300 billion yuan in losses have been caused by various kinds of geological disasters in a period of over 40 years. Weather has caused many disasters. In 1991 alone, 55.47 million hectares of farmland were damaged, directly causing economic losses of up to 120.4 billion yuan. Meanwhile droughts, landslides, hail damage, and frost damage are increasing in the western regions. At the start of the Liberation, droughts occurred once every 10 years and in the 80s it was every 6 years. In the east there are floods, dry spells, typhoons, and coastal erosion, and in 1991, 24,596 hectares of farmland were affected by floods caused by storms causing disastrous damage to 14.614 million hectares of land, which was the worst year for flood damage to farmland since 1949, causing over 70 billion yuan in economic losses.

Corrective Measures

(1) Strengthen the Legal System and Education, and Raise the Consciousness for "Cherishing the Land".

Protecting land resources is everybody's business, and the first order of business is to raise the people's consciousness to "cherish the land". The State Council has designated the 25th of June to be the annual "Earth Alert Day". Various level organizations will make the publicizing of the "earth management laws" a long-term mission, and will put it on the agenda of all levels of the Party and Government.

(2) Perfect the Earth Contract System, and Stabilize Contract Policy.

As China's socialist market economy developed and reforms advanced, the transformation of the land system became an agenda item, and the continued improvement of the land-contract system became the main issue in deepening agricultural reform. The implementation of a long-term earth "entrenchment" policy grew out of the need to control the growth of the agricultural population. The issuing of licenses for long-term land cultivation was seen as an effective systematic method for putting the brakes on short-sighted and rapacious management practices, and to improve the basic environment and support structure for agriculture and its development.

(3) Set up a Tax Recycling System, and Collect Land Taxes.

So that land-use fees will not increase the burden on farmers, they will be apportioned into the total sum of contract fees paid by farm residences. State land laws and

regulations define the scope and standards for collection of land-cultivation taxes and urban land-use taxes. The execution of these laws and regulations is important to the protection of land resources and controlling the growth of the population. It is suggested that the State apply different tax rates to the different qualities of arable land resources to control the disappearance of arable lands. Part of the land taxes are to be used for intensified development of land resources, solve economic difficulties in the process of land development, lessen the financial pressures on the State, make more comprehensive use of land resources, and raise the technical level scientific research.

(4) Raise the Awareness of the National Situation, and Make Sensible Use of the Land.

To break the conundrum of losing land and gaining people day after day, the popular idea that China is a vast territory with boundless resources must be replaced by a new awareness of the national situation, and the recognition that Chinese agriculture is in a dire strait. Take a scientific attitude and realistic approach toward the land environment, and put controls on all farming practices to constantly raise the economic returns to society from the smallest plots of land, and maximize conservation of farmland. The development and use of land resources should not be limited to arable land, but should include the development of larger areas of land resources with good potential. Change the traditional dependency on cereals to a modern concept of food, engender a macro-agricultural concept of planting, till when it is warranted, let grasslands be grasslands and forests be forests, suit measures to local conditions, coordinate tilling and husbandry of resources sensibly, and apply the principle of combined social, economic and ecological benefits in land utilization.

(5) Apply Comprehensive measures, and Control Land Pollution.

Industrial discharge of the "3 wastes" is a source of land pollution. To control pollution, the internal and external environments of industrial production must be rectified. Combined administrative, economical, and legal action is needed to solve the question of industrial pollutants in urban areas. Sources of excessive pollution should be inspected and corrected in minimum time. There should be strict examination and approval processes for new construction, reconstruction and expansion projects to control new sources of pollution. As to the matter of putting controls on chemical fertilizers and pesticides, there should be: 1. multi-type mixtures and careful selection of raw materials before manufacture; 2. Effective, low-toxic and bio-degradable pesticides should be produced to replace the production of high-toxic, ineffective pesticides that have serious residual effects; and 3. There should be more research and dissemination of new fertilizers and pesticides with an aim toward achieving low-cost products that have little or no harmful side effects. While working for all of that, there must be better control, overall planning, and rational distribution of small-town industrial environments and new sources of pollution.

(6) Control erosion, and Prevent the Spread of Sandy and Salty Soils

A combination of tilling, biological, and engineering measures is needed to control erosion. The rural energy structure needs to be reformed, fuel-saving stoves, methane, small hydroelectric and solar energy facilities should be developed, and better water conservancy construction and a line of commercial foodstuffs, oils and cotton bases are needed.

(7) Control Population Growth, and Implement Control Methods

The population load-bearing capacity of China's territory is at a critical point. Population growth is out of hand, and arable land is diminishing. According to the calculations of United Nations agricultural organizations, the median level of food consumption will be reached in 2050, and the minimum per capita consumption of food should be 500-600 kilograms. If China population reaches 1.5 billion as expected, a minimum of 120 million hectares of arable land will be needed. Chinese farmers now make up approximately 72.6 percent of the whole population, and their age structure is rather young, which presents a huge latent reproduction potential. Therefore population growth must be strictly controlled, especially the growth of the rural population.

Measures To Curb Environmental Predicament in the Next 25 Years

94WN0190A Beijing ZHONGGUO KEXUE BAO
[CHINESE SCIENCE NEWS] in Chinese

[Article by Lu Dadao [7120 1129 6670]], of the CAS Institute of Geography

[Text]China's economy will double between now and the year 2000, and China will begin to stand among the world's major economic powers. By 2020, China will have basically achieved its mid-range goal of industrialization, and its socio-economic development will basically have caught up to the level of advanced nations. In the quarter century before this goal is reached, it will be difficult to reverse the trend of a steadily worsening environment, but the country and the society must first lay down a specific policy before it can reduce the threat and pressures of environmental degradation; After the first 20 years of the 21st century, China's ecological environment can be genuinely improved, and economic development and the ecological environment can begin to move forward on a coordinated course.

China Will Be Faced with Serious Environmental Pollution Problems in the Next 25 Years

China must wage a protracted struggle to maintain suitably rapid economic growth.

Between the 1950's and 1973, most of the world's developed nations saw a sustained economic development, but they created rather serious industrial pollution. In 1972 the U.N. Human Environment Conference was held in Stockholm, and the "U.N. Human Environment Report" was issued. It was recognized that population growth and

economic development were the basic causes of the various pollution and ecological environment problems. Western scholars, represented by the "Roman Club" felt that the economic growth of various countries should be limited, and they advocated the "low growth" and "no growth" ideas. The per-capita GNP of the countries where those experts lived was between \$U.S. 15,000 and 25,000, and even at that rate the proponents of those ideas could not get any concurrence. China cannot accept "low growth", much less "no growth". China's GNP averaged to the population is only several hundred U.S. dollars, and China is facing enormous pressures of rapid development, expanding industries, rapidly rising incomes and standard of living. If it were only a question of a rapid development, then the question of the ecological environment could be gradually solved. With the booming economic development and influx of foreign investments following the reforms in China, a six to eight percent economic growth rate probably can be maintained for some time. After 2020, the per capita gross national output value will be about \$U.S. 3,000 to 5,000, after which economic growth will gradually level out, and the post-industrial stage will have been reached.

In the first and middle stages of industrialization, the economy will grow rapidly, and industries that consume large amounts of raw materials and discharge large amounts of wastes will inevitably play a primary role in that growth.

The steel and petroleum industries and the chemical industries, building materials, thermal power, and paper are all big consumers of raw materials and discharge large volumes of pollutants, they belong to the three big ministries and the six big enterprises who are the "big polluters". Because China was a late starter in industrialization, the internal demands and pressures are great, and these industries are in a long historical process and still must quickly increase in scale.

By the end of this century steel production will have reached about 90 million tons, but China wants it to continue its growth up to 2015, and a series of large- and middle-sized steel mills will be built and expanded to make that possible. There are nearly 20 large-scale petroleum bases in China today, and the ethylene production capacity, existing and under construction, is nearly three million tons, not one-fifth that of the U.S., and well below China's needs. By 2020, in addition to the large-scale bases mentioned, more than 10 new bases will be needed. Because of the low level of electrification in China, and 70 percent of that is coal-power, and that can't be changed much, but while nuclear and hydropower are increasing, the desired new increase in thermal power will be 130,000MW to 150,000MW, and over 60 2,400MW big thermal power plants will have to be built. Cement, paper, and common non-ferrous metals will likewise need to be increased on a large scale.

China's population has maintained strong growth over the last 25 years, and between 2010 and 2020 it will peak out; The massive urbanization of the population will change

the consumption structure considerably, adding to the consumption of energy and water, and waste discharge will also be on the increase.

The per-capita consumption of energy in cities is three to five times the rural rate, and the consumption of fresh water is also much greater. If the population migration is not controlled, by 2010, about 500 million people will be living in urban areas, of which probably 200 million will be in clustered towns in large- and middle-sized cities. They will be crowded for space, and basic facilities will be lacking, adding to the industrial and urban pollution, which will intensify the ecological and social problems in those areas. After 2020, the total population and rate of urbanization will diminish, and the pressures on the ecological environment will ease.

The people's average income is still very low, and large amounts of money will not be available for environmental controls and ecological construction for some time to come.

Only through rapid development, namely through raising the economic strength and level of well being, can any good portion of the redistributed people's income be put into the protection of the ecological environment. The U.S. is now putting two to three percent of the people's output value into controlling pollution, and in China, it is about one percent, and that is not being used to full advantage for a variety of reasons.

Two Strategic Ecological Environment Policies Must Be Implemented Simultaneously

China faces two kinds of ecological environment issues:

1. those primarily due to natural forces and human agricultural practices;
2. those primarily due to industrialization and urbanization processes.

Because of drawbacks in China's natural geographical structure, large population, and unwise use of wastelands, there has been serious erosion, encroachment of sand and salt, diminishing grassland, and desiccation, which fall under the first category of environmental issues. The second category includes water, air, and land pollution, acid rain, the greenhouse effect caused by CO₂ emissions, the rising sea level, surface subsidence, sea-water encroachment, insufficient water in concentrated industrial and urban areas, overcrowding, and lack of minimal supplies for capital construction, all caused by the industrialization and social urbanization processes. These two categories of environmental issues differ in respect of their formation and harmful effects, and in their means of control.

China must, therefore, implement two different strategic policies for correcting these environmental problems.

In the 40 years since reconstruction, there has grown a general recognition of the effects of natural forces and agricultural practices on the ecological environment, and State and local funds, manpower, and materials have been put into the effort to control and prevent ecological

damage, including scientific research and experimentation, which have had varying degrees of success in reducing the worsening trend in ecological problems.

The problems of pollution and other ecological environmental issues caused by industrialization and urbanization have gotten much attention since the 1970's, but the public consciousness has yet to be sharpened on these issues. It should be regarded with alarm that these pollution problems are growing worse every day in the process of the rapidly developing economy, and although public opinion, local governments, and basic enterprises keep saying they want to control pollution, that fact is that for financial, organizational, technical, facilities, and management reasons, corrective actions to deal with these environmental phenomena have still not reached widespread governmental and social application. Therefore, during the course of 20 years of economic growth, environmental pollution has spread, and the threat has worsened. The rate of ecological degradation from the second category of causes grows much faster than that of the first category.

To infuse a lasting health into the diversified areas of the society and the economy, the measures for implementing the strategic policy of operating simultaneously on the two categories of environmental issues, namely: continuing to improve comprehensive controls on erosion, desert encroachment, floods and droughts, while striving at the same to control environmental pollution, surface subsidence and sea-water encroachment, eliminate acid rain, and apply measures to improve the living conditions in secondary urbanization areas, should be elevated to status of the consummate strategy for creating a better world for the future generations. The sure course for reaching this strategic goal is:

- (1) Improve theoretical and applied research on human, natural resource, and environmental interrelationships, learn their interrelational operating mechanisms, and publicize it widely among the populace.
- (2) Allocate a higher proportion of the people's income for environmental controls. As the economy develops rapidly, the government and enterprises should put more money into improving the environment and controlling industrial pollution. Try to get the amount of the gross value of national production that is put into the ecological environment up to two percent by turn of century.
- (3) Implement macro-adjustments and controls on the distribution of national industries in long- and mid-term measures fitted to the special natural environmental features of the various large regions and the load-bearing capability of their environments.
- (4) Clarify the responsibilities for pollution control, and reform the product cost-accounting process. Enterprises should factor into the production costs of their products all of the funds that were needed for pollution control, tailored by the amount of threat posed to society by their discharged wastes, and other losses incurred therein, and the government should pick up a part of that cost for input into special environmental foundations to be used for environmental protection projects.

- (5) Be frugal in the use of resources, and set up a resource-saving socio-economic system. That should include creating industrial structures that have low-intensities of resource consumption, developing industrial technologies that conserve or re-use resources and reduce the amounts of discharged wastes.

Legislation Urgently Needed for Solid Waste Control

94WN0057A Beijing ZHONGGUO HUANJING BAO [CHINA ENVIRONMENTAL NEWS] in Chinese
3 Aug 93 p 3

[Excerpts from article by Chen Shuxian [7115 0647 6343]: "Accelerating Solid Waste Legislation Cannot Be Delayed"]

[Excerpts] The development of production inevitably leads to consumption of resources, and as resources are developed the inevitable result is a substantial increase in solid wastes and ecological and environmental destruction. Household wastes are now increasing at an alarming rate. In the developed country Germany, for example, the amount of garbage per capita doubled from the 1950's to 1990's, and the amount of garbage per capita in West Germany in 1989 was 239 kilograms. It is no wonder that people have exclaimed that "mankind will drown in the garbage it has created".

China is a developing country and reform and opening up have spurred rapid economic development. As production develops and people's living standards improve, we similarly will face heavy pressures from growing amounts of solid wastes. Statistics show that industrial residues reached about 700 million tons in 1991 and per capita household garbage in urban areas has now reached 440 kilograms and is growing at an annual rate of eight to 10 percent.

[passage omitted]

The Chinese Government has consistently advocated the rational and full use of resources and protection of the environment is an established basic national policy. The government has conducted broad-ranging propaganda in this area that has now effectively aroused people's environmental consciousness. However, our countermeasures and measures would seem to be ineffective, especially in the areas of using administrative legislation to strengthen restrictions on the generation of solid wastes and in their recovery and utilization, where we lag far behind the developed countries. Thus, it is essential that we strengthen legislation to increase restrictions on the generation of solid wastes and require their re-use to the greatest possible extent to protect resources and the environment, avoid taking the winding path of the developed countries, and deal with the matter of creating prosperity for generations of our descendants as quickly as possible.

[passage omitted]

China is now in the process of making a transition to a market economy, and improving packaging designs is an essential way for enterprises to make their products more

competitive. Thus, in shortening the useful lifespans of products and improving packaging designs, enabling resource utilization and recovery is a question that is very deserving of attention, but it is ignored by most enterprises at the present time.

Because of the growing amount of solid wastes arising from packaging and the continual renovation that is going on now, many countries have formulated specialized decrees to restrict the generation of solid wastes from packaging and help expanded reproduction and utilization. Thus, formulation of the related decrees is the key step, especially in the future when China's enterprises become independently managed legal persons and the government's use of legislation will be an important way to implement macro management.

Reports on Jiaozhou Bay's Environmental Condition

94WN0057B Beijing ZHONGGUO HUANJING BAO [CHINA ENVIRONMENTAL NEWS] in Chinese 4 Sep 93 p 3

[Article by Yang Shuzhen [2799 2885 3791]: "Concern for Jiaozhou Bay"]

[Text] Qingdao, known as the "Jewel of the Yellow Sea" and "Switzerland of the Orient", has grown from a small fishing village 100 years ago to today's developed coastal city with a centralized port and advantages in tourism, light and textile industry, aquaculture, and marine science, its benefits being derived from Jiaozhou Bay. With a broad harbor, deep water, small waves, and light silt, the excellent natural harbor at Jiaozhou Bay is the cradle that gave birth to Qingdao and the basis of Qingdao's future prosperity. However, for the past several years shrinkage of the water area and water pollution have consistently been two major threats to Jiaozhou Bay. Although through the efforts of local government and the related departments the overall environmental situation in Jiaozhou Bay is still acceptable, parts of it and development trends still worry people.

The sea area has been shrinking over the years and this is tending to become increasingly acute.

It has now shrunk from 560 km² before the 1960's to 390 km², which is a 30 percent reduction in its area from that time. The main cause of this acute reduction is man-made as over 10 million tons of all types of garbage are put into the sea each year, while large areas of the sea have been swallowed up by enclosure of the sea to create land and the opening up salt fields and shrimp pools. There is also serious water pollution. Because of urban population growth and industrial development, 84.67 million tons of industrial waste water and 39.28 million tons of household waste water are injected into Jiaozhou Bay each year. Furthermore, each year more than 2,700 ships enter Jiaozhou Bay which discharge about 90,000 tons of waste water containing oil. Added to the frequent oil leak accidents, the quality of the water has become severely polluted. Because of this pollution from a variety of sources, the results of monitoring of the water in Jiaozhou Bay

show that the water area where the water quality has been degraded now comprises about 29.29 percent of the total water area.

Shrinkage of the water area and water pollution have serious outcomes. Shrinkage of the water area inevitably results in reductions in the amount of tides and with the reduction in tides there is a weakening of the strength of water motion, which results in a reduction in replacement of the water body and in the silt-carrying capacity. This increases the possibility of pollution and silt accumulation in the sea and has caused the rate of sedimentation to rise over the years. Silt accumulation has also caused a reduction in the water area and in the amount of tides. Being repeated in this manner, it forms a vicious cycle whose outcome we cannot dare imagine. Moreover, greater pollution directly destroys the marine ecology and environment and seriously affects the existence of marine organisms. In Cangkou Bay, for example, there were 141 species of intertidal zone organisms in the 1960's including as many as 52 species of crustaceans. By the 1970's only 30-odd species of organisms including just 12 crustacean species were left. In the 1980's only 17 species of organisms including four species of crustaceans were left. By 1989, only nine species of organisms were left. At the same time, the seawater breeding industry, harbor piers, military facilities, beach environment, seawater bathing beaches, and the ecology and environment were all damaged to varying degrees.

Because of Jiaozhou Bay's unique status and important significance, people have become much more concerned about the situation in Jiaozhou Bay and the question of how to develop, utilize, and protect Jiaozhou Bay has consistently been a hot topic of concern debated by people for many years. The relevant experts and scholars have offered many countermeasures and suggestion, the main ones being:

- 1) Strengthen propaganda and education, raise people's consciousness concerning our maritime territory. Have a correct understanding of and scientifically evaluate the environmental situation in Jiaozhou Bay, establish the concept of coordinated development of the economy with environmental protection and moving forward simultaneously.
- 2) Establish a unified and authoritative comprehensive development and environmental protection management organization for Jiaozhou Bay for unified management of development and protection.
- 3) Rely on scientific management and decision-making to form an effective marine environmental protection scientific decision-making system, strengthen scientific research and scientific management of Jiaozhou Bay, creation of shrimp pools and salt fields, repair of shoreline walls, construction of tidal barriers, linking islands, and other projects should be debated before construction can begin.
- 4) Strengthen construction of the legal system, compile a Jiaozhou environmental protection and management law as quickly as possible, strictly control discharges of pollutants, dumping of wastes, oil leaks, and other pollution

sources and establish legislation for all of them and manage affairs according to the law.

Being concerned about Jiaozhou Bay is not something based on imaginary or groundless fears. Its objective is to arouse a sense of urgency among people for protecting Jiaozhou Bay and make Jiaozhou Bay healthy and long-lived.

Remote Sensing Reveals Enormous Soil Erosion Problem

94WN0057C Beijing GUANGMING RIBAO in Chinese
8 Sep 93 p 1

[Article by reporters Zhang Biyong [1728 4310 8673] and Chen Cairong [7115 1752 2837]: China's Soil Erosion Area Covers Over One-Third of Our National Territory, Achievements in Control Offset Man-Made Destruction of Vegetation"]

[Text] The results of a recent remote sensing survey show that China's soil erosion area covers 3.67 million square kilometers, equal to 38.2 percent of our national territory. At the "People's Republic of China Soil Erosion Law Implementation Regulations" press conference held in Beijing on 8 September 1993, Ministry of Water Resources minister Zhou Wenzhi [0719 2429 2535] stated with fervor that severe soil erosion is posing a threat to our natural environment and national economy.

Zhou Wenzhi said that China is losing an estimated five billion tons-plus of soil each year, equivalent to 17.5 million mu of land cultivated to a depth of one foot. The total amount of associated losses of nitrogen, phosphorous, and potassium nutrients far exceed total chemical fertilizer applications in China each year. According to incomplete statistics, during the past 40 years we have lost 40 million mu of cultivated land due to soil erosion, resulting in economic losses of about 10 billion yuan a year.

Zhou Wenzhi pointed out that improvement along with destruction is an important cause of degradation of the soil erosion situation. He said that since Liberation, it has received a high degree of concern from the party and government, and through the arduous efforts of vast numbers of cadres and the masses, China has controlled an area of soil erosion covering more than 500,000 square kilometers and major changes have truly occurred in some places. However, at the same time man-made destruction of vegetation has caused soil erosion over an area covering

about 20,000 kilometers each year, which is equivalent to the area where soil erosion has been controlled in China over the same period, basically offsetting achievements in control. As the pace of development and construction has accelerated and our population has grown, the rate of destruction to soil resources by people has grown at a huge rate and the soil erosion situation has worsened. To achieve a fundamental reversal of this situation, we must rely on the rule of law.

Evidently, the newly-promulgated "People's Republic of China Soil Erosion Law Implementation Regulations" are important laws and regulations matched up with the "Soil Conservation Law" and they provide concrete provisions for the core regulations in the "Soil Conservation Law" and strengthen their operability.

Using Microorganisms To Treat Heavy-Metal Contaminated Wastewater

94WN0057D Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 15 Oct 93 p 2

[Article by Gao Zhu [7559 2691] and Yan Changxuan [7346 2490 6513]: "Chengdu Using Microorganisms To Treat Heavy-Metal Wastewater"]

[Text] Experts in the Chinese Academy of Sciences Biology Institute have developed the first successful new method for using microorganisms to treat industrial wastewater that contains chromium and other heavy metals. In actual use in a demonstration project using microorganisms to treat wastewater from electroplating at Jingjiang Electric Motor Plant, they have obtained excellent results in purifying wastewater and recovering heavy metals. Now, this project, which is a project to attack key problems in the State Science and Technology Commission's Eighth five-Year Plan, has passed examination and acceptance by experts in Chengdu directed by the Chinese Academy of Sciences.

In use, this method mixes selected excellent quality and high efficiency bacteria with heavy-metal wastewater that absorb water like a piece of bread and cause the heavy metals to precipitate at the bottom of the tanks. Inspection by environmental protection departments indicates that the rate of removing heavy metals from wastewater is as high as 99.7 percent, with a heavy metal recovery rate of more than 80 percent without causing secondary contamination. The treated water completely conforms to the discharge standards stipulated by the state.

CAMBODIA

Ranariddh Urges 'Severe' Environmental Protection Steps

BK0706075494 Phnom Penh AKP in French 0400 GMT 7 Jun 94

[Text] Phnom Penh 7 Jun (AKP)—Prince Krompreah Norodom Ranariddh, first prime minister of the Royal Government of Cambodia, declared he was worried about Cambodia's environment, which had been seriously threatened during the past decades.

In his speech made on World Environment Day, the head of the royal government said he wanted a law on environmental protection to be promulgated.

"The war, which has lasted for over two decades, has destroyed the environment in the country," said Prince Norodom Ranariddh. "This," he said, "would plunge Cambodia into the abyss of disaster if we (the new generation) did not coordinate efforts to fight this crisis."

The Cambodian leader recalled that the flood of 1991, exceptional for Cambodia, was one of the consequences of environmental destruction.

The prince wanted severe measures to be taken to protect the environment, and he invited Cambodians to follow him in that direction.

Prince Krompreah Norodom Ranariddh pledged to implement the UN environmental program. He thanked international organizations for helping to save Cambodia's environment.

REAKSMEI KAMPUCHEA on Forest Destruction, Economic Issues

BK0606135394

[Editorial Report] Phnom Penh REAKSMEI KAMPUCHEA in Cambodian on 4 June carries the following reports in its business section:

Concerning the domestic transportation of timber, the paper says that 30 barges carrying processed wood to Phnom Penh have been stranded at the Kratie provincial port for nearly a month because the province's Department of Forestry and Wildlife has refused to issue a permit. No reason has been given. The paper calls on the department to explain its action, saying that the government has not banned the transportation of processed wood for local use and that the Ministry of Agriculture, Forestry, Wildlife, and Fisheries has even taken bids for the exploitation of 29 forest lots across the country. Citing the extra fees that the timber merchants are forced to pay because of the ban, the paper calls on the department to announce future transportation bans in advance.

In a report on the privatization of state-owned factories, the paper says that of the 59 factories put into operation since 1979, 42 have been rented, 10 have been sold to the local private sector and foreign investors, and seven remain under government control. The paper cites the director of the Industry Ministry's Planning Department

as saying that many businessmen are interested in renting the remaining seven factories, but are hesitant because of the many preconditions and problems. For example, they must hire all of the current workers in each factory and do not have the right to fire any of them, even if they break the rules or refuse to work. Also, they need to renovate and modify the factories and the machines—which are not in good condition—but the import of spare parts is time consuming and involves many procedures.

On the destruction of Cambodia's forests, the paper blames the government for granting logging concessions to foreign companies. It says that although a log export ban has been in effect since 30 March 1994, many foreign companies are still cutting Cambodian trees and transporting logs out of the forests. As an example, it cites a joint venture between Malaysia, Indonesia, and Singapore located at Prek Prasap Leu village in Prek Prasap District of Kratie Province. The paper says the government and the Ministry of Agriculture, Forestry, Wildlife, and Fisheries might not know about the activities of this company because even the Kratie provincial governor and Prek Prasap District governor have pretended not to hear about it. About 40,000 cubic meters of logs already cut by this company are being transported out of the province. Forestry officials have revealed that after the government imposed the log export ban, the company stored logs temporarily at Prek Phnoeu and is looking for other ways to get the logs out of Cambodia. The company plans to export a total of 90,000 cubic meters of logs in the 1993-94 period.

INDONESIA

Daily Views 'Environmental Soundness' of Companies

BK0306084194 Jakarta THE JAKARTA POST in English 26 May 94 p 4

[Editorial: "Disposing of Waste"]

[Text] Although it may not have been one of the more sensational events of the week, the inauguration on Monday of this country's first industrial waste treatment plant surely deserves some comment.

The truth is that for far too long too many companies in Indonesia have been reluctant to seriously consider the problem of waste treatment.

To address this problem, on the eve of the new plant's inauguration, the government issued a regulation requiring all manufacturing companies to neutralize their toxic and hazardous wastes. In the past, many industries were reported to have raised objections to precisely such a requirement on the basis of the argument that the process would add too heavily to their production costs and make their products less competitive.

Of course for companies operating on a small scale, such an argument may be true to a certain extent. After all, manufacturing firms have to cope with what economists refer to as the economy of scale. That is, the bigger the

factory and its operations, the lighter the cost burden which the manufacturer has to bear relative to the volume of goods produced. Such an argument, therefore, seems valid, especially since small-scale industries comprise an important segment of this country's industrial sector. They not only provide a service to the society by turning out goods, but also by providing jobs to many thousands of people.

The significance of the Nambo Village waste treatment plant in this particular context is obviously that it helps bring down those additional production costs for small-scale enterprises by eliminating the need for them to own and operate their own waste treatment plants.

In the past, even larger industries were reported to have used this argument to object to any government regulation that would require them to treat their toxic wastes. Surely, however, the developments of the last several years have made it clear that such a rationale can no longer hold. Under the new world order that is now rapidly taking shape, even the trade and industrial sectors can no longer act as if they are unaffected by the spirit of environmental awareness that is now rapidly spreading across the globe. It is in their own interest that industrialists respect the principles of environmental soundness if they want to compete in the world market.

Thus, as President Suharto remarked on the occasion, the inauguration of the new U.S.\$95 million plant is expected to make Indonesia's industrial products more competitive on international markets by meeting the criteria of environmental "cleanliness" that more and more countries around the world are setting for their imports. The new plant, located at Nambo Village in Bogor regency, is the first in Indonesia, as well as the biggest of its kind so far in Southeast Asia. A second plant for the treatment of industrial wastes is now reportedly being planned for construction near Surabaya, East Java's provincial capital, which has the second-largest concentration of industries in Indonesia. Similar plants are also being planned for Lhokseumawe in Aceh and for East Kalimantan.

Surely, as this country prepares itself for its take-off towards self-sustained growth and because the industrialization process is bound to accelerate in the years to come, the launching of the Nambo Village waste treatment is a laudable, albeit small, step towards ensuring that the process of development will not impair the sustained health of our environment.

German Minister Views Proposed Tropical Wood Ban

BK0606114994 Jakarta ANTARA in English 0939 GMT 6 Jun 94

[Text] Jakarta, Jun 6 (OANA-ANTARA)—Visiting German Minister for Economic Cooperation and Development Carl-Dieter Spranger on Sunday blasted as "unrealistic" the proposed ban on the import of tropical wood products and said the ban will impede the conservation of tropical forests which serve as the lung of the earth.

"If the ban on the import of tropical wood products is effective, these forest products might give no economic advantage to countries which have tropical forests, and that they will find it difficult to conserve their forests," Spranger told the press at the Sukarno-Hatta airport a moment before he left for home.

Environmentalists in the United States and Europe have proposed that their governments impose a ban on the import of tropical wood products from developing countries.

Spranger said he had seen for himself Indonesia's well-planned efforts to conserve its forests without necessarily sacrificing the ecosystem.

It was natural for Indonesia which had huge tropical forests to utilize its natural resources, including tropical forests, he said.

Earlier, Forestry Minister Jamaludin Suryohadikusumo briefed the German minister on the management of Indonesian tropical forests. Spranger also visited tropical forests in East Kalimantan during his stay.

According to Spranger, the Indonesian Government was determined to conserve its tropical forests while exploiting part of them to gain foreign exchange earnings.

He said he was in support of Indonesia's efforts to disseminate objective information on the management of tropical forests in developing countries.

In 1993, Indonesia exported an estimated nine million cubic meters of tropical wood worth U.S.\$6.5 billion. Japan was the biggest market for Indonesian tropical wood, followed by the United States and European countries.

Spranger said Germany was prepared to provide the Indonesian Government with technical assistance to manage its tropical forests.

Suharto Inaugurates Industrial Waste Treatment Center

BK0106135694 Jakarta THE INDONESIA TIMES in English 24 May 94 p 1

[Excerpt] Jakarta—President Suharto on Monday reminded all countries of the need to build treatment centres for hazardous and toxic wastes, saying that Indonesia and other developing countries do not want to be dumping places of those wastes.

"The construction of an industrial waste treatment centre reflects self-reliance in handling its own hazardous and toxic wastes," President Suharto said during the inauguration of the industrial waste treatment centre in Cileungsi, south of Jakarta.

The waste treatment centre, managed by P.T. [Company Limited] Prasada Pamunah Limbah Industry, is jointly owned by the Bimantara Citra Group, the Waste Management International of Britain, and the Environmental Impact Management Agency (Bapedal), a government body.

The president said the construction of the hazardous waste treatment centre also shows that Indonesia is committed to an agreement reached during the Earth Summit in Rio de Janeiro, Brazil in 1992 on environment-oriented development.

He also said that the well-guided management of industrial waste would make Indonesian products more competitive at the international market on the grounds that many foreign countries had issued import regulations and requirements linked to the conservation of nature.

Attending the ceremony were First Lady Tien Suharto, House Speaker Sutejo [name and title as published], State Minister for National Development Planning/Head of the National Development Planning Board Ginanjar Kartasasmita, and Minister of Administrative Reforms T.B. Silalahi.

Earlier, State Minister of Environment Sarwono Kusumaatmaja reported to the president that as many as 23 companies handed over 43 kinds of wastes to the Waste Treatment Centre (PPLI) which has the capacity to process some 88,000 tons of waste. [passage omitted]

JAPAN

Tokyo, Beijing Sign Agreement on Ibis Breeding Program

OW0706140794 Tokyo KYODO in English 1124 GMT 7 Jun 94

[Text] Tokyo, June 7 KYODO—Japan and China formally sealed a deal Tuesday [7 June] under which Beijing will provide a couple of young Japanese crested ibises for a breeding program which hopes to preserve the nearly extinct species in Japan.

Chinese Forestry Minister Xu Youfang, who arrived in Japan on Monday, and Japan's Environment Agency chief Toshiko Hamayotsu signed an agreement covering a three-year lending period for the rare white birds following talks in the afternoon.

The last two Japanese crested ibises remaining in Japan, 27-year-old Kin and about 20-year-old Midori, are considered too old to reproduce—in human terms they would be over 80 years old.

China will send the ibis couple in late September to their new home at the newly built Sado Ibis Preservation Center in Niiho, Niigata Prefecture, which since last autumn has also been the home of Kin and Midori, hoping to see the first chicks hatch next spring at the earliest.

Transport during the breeding period from February to June and during the hot summer season could harm the birds, which are said to be very sensitive to changes in their habitat.

During their first month in Japan, the birds will be looked after by four Chinese experts including two feeding specialists, who will also train staff at the center in the latest breeding methods.

China is the only other country in the world where the Japanese crested ibis survives. Following the hatching of

an artificially incubated ibis egg in a Chinese zoo in 1992, a world premier, China succeeded in incubating 12 chicks, bringing the total ibis population to around 50.

Ibises usually breed in March or April laying two to four eggs. Under the agreement, China will get the first hatchling, while Japan may retain every second ibis chick being born through the breeding program.

It will be the first time China has loaned a pair of ibises to another country. The ibises have not been selected yet, but will most likely be inexperienced in reproduction matters because so far none of China's ibis couples has had offspring naturally.

The ibis project took shape when former Japanese Prime Minister Morihiro Hosokawa, during his official visit to China in March, asked his Chinese counterpart Li Peng for help in the preservation of the rare bird.

Four breeding attempts by Kin or Midori and a Japanese crested ibis from China have failed over the last decade.

However, Japanese experts plan to preserve the genes of Kin and Midori after their death in a bid to reproduce the birds through the use of biotechnology in the future.

PRC Environment Team Seeking Funding in Tokyo

OW0606042294 Tokyo KYODO in English 0336 GMT 6 Jun 94

[Text] Tokyo, June 6 KYODO—A Chinese environmental delegation began meetings Monday [6 Jun] to seek funding from Japanese aid agencies and businesses for a four billion dollar sustainable development plan for China.

China's Agenda 21, developed with the UN Development Program (UNDP), contains 64 priority projects and over 500 total projects for sustainable and environmentally sound development in the next century, said Shi Han, a delegation member.

The delegation, led by Shi Jianmin, vice minister of China's State Planning Commission, arrived in Japan on Sunday.

It is scheduled to meet with several governmental and business organizations including the Foreign Ministry, the Environmental Protection Agency and the Ministry of International Trade and Industry.

China hopes to use part of the Agenda 21 funds to help make its industry more energy-efficient. It also wants to launch a clean-coal technology exchange with Japan, Shi said.

Tokyo To Send Wildlife Experts to Ecuador

OW3005074694 Tokyo KYODO in English 0637 GMT 30 May 94

[Text] Tokyo, May 30 KYODO—Japan will send a group of experts on wildlife protection to the Galapagos Islands, Ecuador, from Friday to June 27 to help survey damage caused by a forest fire, the Foreign Ministry said Monday [30 May].

The government will send six experts through the Japan International Cooperation Agency (JICA), in response to a request from the Government of Ecuador, the ministry said.

The group, comprised of experts on birds, reptiles and botanical ecology, will visit Isabela Island, the largest of the Galapagos group, to survey the effects on wildlife of the prolonged forest fire that has been burning since April 12, it said.

The experts will also offer advice to Ecuador's presidential panel for disaster prevention on measures to protect and increase reproduction of wildlife, to repair damage, and on monitoring the natural environment, the ministry said.

The forest fire on the 460,000-hectare Isabela Island has not yet been completely extinguished. As of April 26, some 10,000 hectares had been devastated by the fire, it said.

Wildlife peculiar to the Galapagos Islands, such as iguanas and giant tortoises, is endangered by the fire. The island's ecosystem is also seriously affected, the ministry said.

White Paper Endorses Environment Taxes, Investment

OW3105032794 Tokyo KYODO in English 0254 GMT 31 May 94

[Text] Tokyo, May 31 KYODO—The 1994 white paper on the environment approved by the cabinet Tuesday [31 May] endorses the introduction of "environment taxes" to transform Japan's throwaway society into an economy "less burdensome to the environment."

Prices should reflect the detrimental effects of production processes, products, and services on the environment, while investment in environment-friendly "green" businesses must be promoted, the Environment Agency's paper suggests.

For a successful turnaround of the economic system both, producers and consumers have to be involved, it said.

Consumers must be educated about an ecological lifestyle that breaks with the entrenched habits of unrestrained consumerism.

The corporate world, too, must be made aware of the business opportunities environment technology and eco-oriented industries offer as environmental awareness heightens, the paper said.

Despite technological progress that has helped to curb machine energy consumption, each Japanese consumes more than double the world average in primary energy.

This is due to large-scale consumption and the never-ending quest for a higher and "bigger" living standard, according to the paper.

Consumers could play an important role in the ecological transformation by making choices and buying green products, which would eventually force producers to develop more environment-friendly products.

The paper does not trust the market forces alone and recommends introducing taxes that take into account environmental costs and to impose charges on ecologically harmful products and activities to foster the ecological transformation.

An environmental tax such as a levy on carbon dioxide emissions was under discussion last year, but the basic environment law, adopted last November, simply urges the government to consider imposing a tax on polluters.

The white paper also advocates further expanding deposit systems for bottles and other reusable containers.

It claims that industrial production could be even extended in the latter part of the 21st century without further destroying the environment, if investment over the next 50 years focuses on antipollution measures and the saving of scarce resources.

Sewage facilities and other investments in environmental protection would also pay off by stimulating the slumping economy, the paper says.

For an effective ecological overhaul of the economic system, which should be laid out in the nation's basic environment program currently being worked out, the government should consult with industry, civic groups and municipal bodies, the paper suggests.

Sources Report Differences Over Desertification Plans

OW0206053094 Tokyo KYODO in English 0443 GMT 2 Jun 94

[Text] Tokyo, June 2 KYODO—Countries meeting in Paris next Monday [6 Jun] to frame a convention to prevent desertification are still at odds over how to fund the effort, despite an unofficial Canadian-Zambian initiative for a compromise proposal, government sources said Thursday.

The desertification convention is due to be adopted at a fifth intergovernmental negotiating committee meeting June 6-17.

But due to continued disagreement between advanced countries and developing countries, which have requested the establishment of a fund for prevention of desertification, the sources said it is likely the treaty will be adopted without a final agreement on the funding issue.

The convention document is one outcome of the United Nations-sponsored Earth Summit in Rio de Janeiro in June, 1992.

The document is an action plan to combat desertification, or aridity caused by human intervention due to overgrazing or excessive cultivation.

It calls for technical assistance and funding from advanced countries to carry out preventive measures.

Estimates put the annual rate of desertification around the globe at 60,000 square kilometers in more than 100 countries.

Aid from developing countries to combat the trend is estimated at 850 million dollars a year.

Developing countries want a new funding mechanism and the inclusion in the convention of an undertaking reached at a UN General Assembly meeting prior to the Earth Summit for developed countries to reserve 0.7 percent of their gross national product for government official development assistance (ODA).

But a number of advanced countries, including the United States, have insisted that inclusion of the UN target in the convention would justify demands by developing countries for increased funding.

They have said they have no room to increase their funding because of a worldwide depression and are insisting that funding is possible if existing forms of ODA are used effectively.

Canada and Zambia are behind an unofficial drive to produce a last-minute compromise draft.

Japanese Government officials said developing countries need such assistance and tend to accept the view that a new funding mechanism should be established with certain conditions attached while making the UN target nonbinding.

Advanced countries and developing countries have also differed over the inclusion in the convention of measures to prevent the spread of poverty in African countries in addition to those designed to prevent desertification.

NORTH KOREA

Meeting Marks World Day of Environment

SK0406070394 *Pyongyang KCNA in English*
0506 GMT 4 Jun 94

[Text] Pyongyang, June 4 (KCNA)—A meeting was held here Friday under the sponsorship of the State Environmental Commission on the occasion of the world day of environment.

At the meeting Yi Sang-nak, vice-chairman of the State Environmental Commission, gave a lecture under the title "One Globe, One Family."

Noting that environmental protection has become an important common task facing the mankind in saving it from environmental pollution and degradation and making a sustained development, he said the developed industrial nations have thrown away a fabulous amount of polluting materials, seriously polluting the environment of the globe and causing irrevocably grave damage to the lives and health of the people.

"In our country, the best socialist system of Korean style centred on the people has been built and an environmental policy for the people has been pursued under the wise guidance of the great leader Comrade Kim Il-song and the dear leader Comrade Kim Chong-il, with the result that enormous achievements have been registered in environmental protection in the country", he said, and continued:

"The great leader's idea of environmental protection has been successfully carried forward by the dear leader. In the days when he began leading our revolution, the dear leader expounded an original idea that environmental protection is not merely a technical and working matter but an important political one for improving the people's health and providing them with conditions for an independent and creative life, and clearly indicated the way of carrying it into practice.

"The adoption of 'the law of the Democratic People's Republic of Korea on Environmental Protection' has led to the codification of the idea of the great leader and the dear leader for environmental protection and the achievements in this domain."

Referring to the tasks for environmental protection, he declared: "We will as ever remain faithful to the international obligation for environmental protection by honestly discharging the national duty for it."

The chief of the United Nations Development Program [UNDP] mission also spoke at the meeting.

A friendship gathering between officials of the state environmental commission and members of the UNDP mission took place.

Papers Observe 'World Day of Environment'

SK0506094894 *Pyongyang KCNA in English*
0832 GMT 5 Jun 94

[Text] Pyongyang, June 5 (KCNA)—Papers here today observe "World Day of Environment".

Noting that mankind is now facing a grave environmental problem, an article of NODONG SINMUN says:

One billion people live in very polluted air and about 10 million people die annually from various diseases caused by polluted water worldwide.

In capitalist countries the monopolies operate polluting factories, without taking anti-pollution measure, seriously polluting the environment, while pursuing only profits.

Continuous nuclear tests and manufacture of nuclear weapons, nuclear war exercises let out a large amount of radioactive substances, gravely destroying environment.

Mankind demands a blue sky and clean water and air.

No small number of countries are increasing investments in the protection of environment and taking measures for preventing pollution.

Korea is called a beautiful land with thick forests and clean water, free from pollution, thanks to the correct policy of the Workers' Party of Korea on environmental protection.

A MINJU CHOSON article says:

The government of the Democratic People's Republic of Korea is making all efforts to fulfil its national duty for the protection of global environment. The Korean people will intensify the work for environmental protection together with all the world peaceloving people.

SOUTH KOREA

ROK, PRC Select Six Areas of Joint Environment Research

SK0406031294 Seoul YONHAP in English 0003 GMT
3 Jun 94

[Text] Seoul, June 4 (YONHAP)—South Korea and China selected air pollution, acid rain and waste disposal among their six areas of joint research at their first environment cooperation talks, the Foreign Ministry said Saturday.

They agreed in principle to form a network among environmental officials and experts of the two countries and named the South Korean Foreign Ministry's International Economic Affairs Division and China's National Environment Protection Agency International Cooperation Bureau as representatives of the network.

The six selected research areas include air pollution, acid rain, water contamination, waste processing, environment projects and city-level environmental planning, the ministry said. Chief delegates from the two sides signed a memorandum at the end of their two-day meeting agreeing on these points.

Seoul and Beijing hope to form a trilateral cooperation channel with Japan for regional projects, ministry officials said.

South Korea and China will hold a second round of environment cooperation talks in Beijing sometime during the first half of next year.

Researchers Study Effect of PRC Air Pollutants on ROK

SK3105064794 Seoul YONHAP in English 0603 GMT
31 May 94

[Text] Seoul, May 31 (YONHAP)—Levels of carbon dioxide and methane, blamed for the greenhouse effect, are higher in Korea's southwestern Taean peninsula than in China, Mongolia and Hawaii, according to a study by Korean scientists.

Another study shows that acid rain occurs in rural or remote areas like Chongwon, North Chungchong Province, Cheju Island and the Taean peninsula—not as a result of air pollutants from Korea but from China.

Chong Yong-song, head of the Korea-China Center for Atmospheric Research based at the Korea National University of Education in Chongwon, and his associate researchers presented their observations at the four-day fourth international conference on Atmospheric Sciences and Applications to Air Quality (ASAAQ) that started Monday at a hotel in southeastern Seoul.

Their studies, particularly of the Taean peninsula, were compared with the results of carbon dioxide and monoxide, and methane observations obtained by their counterparts from China, Mongolia and Hawaii at Mt. Waliguan, Ulaan Uul and Mauna Loa.

Their observations of carbon dioxide levels since November 1990 show that the Taean peninsula is generally under the influence of airflows coming from China.

The Korean scientists say their analysis indicates that according to methane data from Mongolia and several sites in the North Pacific, the Taean peninsula is influenced as much as 31 PPB (parts per billion) on average by Chinese emissions.

In his study on the background-level acidity of precipitation in Korea, conducted jointly with fellow researcher Kim Tae-kun, Chong concludes that annual pH values in rural areas that are isolated from major industrial regions are "weak acid" ranging between pH 5.0 and 5.3.

In Chongwon, a rural area situated in central Korea, 173 days (64 percent) showed acid precipitation out of a total 271 days. Higher frequencies of acid precipitation indicate that it is spreading out in the rural areas of Korea.

Acid rain in rural or remote areas like Cheju Island and the Taean peninsula, the scientists say, is carried by rain clouds from southern China usually containing high values of acidity.

Considering the annual 10-percent rise in energy production in China, acid rain is feared to frequently occur in Korea, they conclude.

Government Retracts Plan To Store Nuclear Waste in Uljin

SK0106100994 Seoul YONHAP in English 0958 GMT
1 Jun 94

[Text] Uljin, June 1 (YONHAP)—Yielding to local villagers' protests, the government has retracted a plan to build a large radioactive nuclear waste disposal yard here in Uljin along the east coast.

Uljin County Commissioner Kim Tong-hui met reporters Wednesday afternoon to make public Science and Technology Minister Kim Si-chung's message containing the retraction.

The message read in part, "This is to inform you that although some residents of the Uljin area tried to induce a radioactive waste management facility, the government has decided not to set up such a facility in the Uljin area in consideration of various conditions."

Meanwhile, large crowds of Uljin people mounted various protest actions for the fifth straight day Wednesday against the planned creation of a nuclear waste yard.

About 1,500 high school students staged a sit-in along a major road near Uljin-up beginning around 2 PM while about 200 shop owners in the Uljin town closed their shops for the day as a sign of protest.

Around 12 noon, some 1,000 villagers of Puk-myon poured into the street and blocked traffic.

Of the 12,000 primary and secondary school students in the Uljin area, about 10,000 boycotted classes Wednesday in a protest move.

ROK, China Begin Two-Day Talks on Environment

SK0206064094 Seoul YONHAP in English 0550 GMT
2 Jun 94

[Text] Seoul, June 2 (YONHAP)—South Korea and China opened their first bilateral environment talks in Seoul Thursday to exchange information on environmental policies.

The two countries will agree to promote Northeast Asian environmental projects and enhance cooperation in international projects through global forums such as the United Nations, officials said.

On bilateral issues, Seoul is expected to address the problem of cross-border air pollution during the two-day meeting.

Choe Yong-chin, director-general of International Economic Affairs, heads the talks along with Xia Kunbao, director-general of the International Cooperation Bureau at the National Environment Protection Agency.

In a separate move, South Korea's National Institute of Environmental Research will sign an agreement with the Chinese Research Academy of Environment sciences on Friday to create a framework for joint study of issues of mutual concern.

LAOS

Government Denies Thai Charge on Use of Toxic Chemicals

BK0406080394 Vientiane Vitthayou Hengsat Radio
Network in Lao 1200 GMT 3 Jun 94

[Excerpt] On 3 June at the meeting hall of the National Defense Ministry, the Lao-Thai general border peacekeeping cooperation committee held a press briefing to deny a charge made by the Thai side alleging that the Lao side used toxic chemicals in areas along the Lao-Thai border. The charge was made by Colonel Prasit Mongkhontham, deputy chief of staff of the Third Region of the Thai Army and member of the Thai-Lao general border peacekeeping cooperation committee, in his interview carried by the 16,298th Saturday issue of the DAILY NEWS newspaper on 28 May 1994, the THAILAND TIMES newspaper on 27 May 1994, and many other Thai newspapers. The colonel charged that in the past two months, the Lao People's Army sprayed toxic chemicals in water sources and (?lakes) in areas along the Thai-Lao border opposite Chiang Kham District in Phayao Province, Mae Rim District in Nan Province, and (Bansok) Village in Uttaradit Province, killing a large number of animals and Lao inhabitants.

With regard to this development, the Lao side categorically denies such an allegation. The denial was made at the press briefing by Brigadier General Douangchai Phisit, member of the party Central Committee, deputy chief of the Army General Staff Department, and chairman of the Lao-Thai general border peacekeeping cooperation committee. [passage omitted]

PHILIPPINES

Ramos Lifts Ban on Entry of Imported Toxic Wastes

BK0206091994 Manila PHILIPPINE DAILY
INQUIRER in English 30 May 94 pp 1, 10

[By Juan V. Sarmiento Jr.]

[Text] President Ramos yesterday, lifted the ban on the entry of industrial wastes into the country, aggravating fears among environmentalists that this would open the floodgates to the dumping of toxic wastes here.

Mr. Ramos has ordered the Department of Environment and Natural Resources and the Bureau of Customs to lift the ban on the importation of used plastics and paper wastes as well as scrap iron and steel.

He also authorized the release of similar shipments which have been held by customs authorities.

Mr. Ramos said exempting waste materials from the import ban would help save dollars for the country and provide local industries with cheaper raw materials.

"Such exemption is based on the economic impact such as potential stoppage of the...industry operations due to unavailability of process(ed) materials as well as potential loss of foreign exchange," Mr. Ramos said in a memorandum to Environment Secretary Angel Alcala and Customs Commissioner Guillermo Parayno Jr. [sentence as published]

Alcala said plastic scraps are four times cheaper than the plastic raw materials and that paper waste would reduce dependence on virgin pulp taken from trees.

As for the iron and steel industry, Alcala said the local supply cannot meet domestic demand of 500,000 metric tons a year. The construction industry is the main user of iron and steel.

Aided by the government's weak monitoring capability, traders have been shipping toxic wastes to the Philippines.

In March, a Greenpeace patrol blocked a Russian-registered container ship, Gamzat Tsadasa, delivering 42 tons of toxic computer scraps from Australia to Manila.

Greenpeace said computer scraps are often contaminated with asbestos and other toxic materials.

Two months ago, another shipment of 45 containers of "PVC scrap," a hazardous waste, from Germany was reported on its way to the country.

Trade of hazardous waste is banned by the Basel Convention on the Transboundary Movement of Hazardous Wastes.

Maximo Kalaw Jr., president of Green Forum Philippines, said the importation of hazardous wastes is also prohibited under Republic Act 6969, also known as "The Toxic Substances and Nuclear Wastes Control Act of 1990."

But Greenpeace said the, Philippines has been unable to detect and intercept incoming shipments of thousands of

tons of hazardous wastes, including scrap metal, plastic waste, old computers and lead scrap.

Greenpeace statistics showed that from 1990 to 1993, a total of 64,385 tons waste were shipped to the Philippines from the United States, Australia, Canada, Germany and the United Kingdom.

Greenpeace described the Philippines as a "major dumping ground of plastic waste" when it allowed entry to shipments of 18,000 tons of U.S. plastic scrap from 1991 to 1993.

The United States shipped 27,226 tons of scrap metal to the Philippines in 1990 alone.

The United States has admitted dumping toxic battery waste to the Philippines and other countries.

TAIWAN

Legislator Accuses U.S. Firms of Dumping Harmful Waste

OW0506113794 Taipei China Broadcasting Corporation News Network in Mandarin 2300 GMT 2 Jun 94

[From the "Hookup" program]

[Text] Legislator Chao Shao-kang yesterday revealed that, over the last nearly 30 years, U.S. company RCA has dumped organic waste harmful to human health into self-dug wells near its factory, seriously polluting the underground water and soil in Taoyuan's Chupei area. To prevent local residents from being further harmed by drinking underground water, in addition to urging the Environmental Protection Administration [EPA] to examine how seriously local soil and underground water have been polluted, Chao Shao-kang also hoped the Public Health Administration [PHA] would investigate the matter. The following is a report by Lin Sung-hua. [Begin recording]

Lin: Those living in Taoyuan's Chupei area should be aware that the underground water you have been drinking might have impaired your health for a long time. On 2 June, Legislator Chao Shao-kang revealed that organic waste generated from manufacturing electronics products by [words indistinct] has been dumped either in the areas near the factory or into wells the company dug near the factory, and this might have caused harmful effects on local residents over the last nearly 30 years. Legislator Chao pointed out that the Taiwan U.S. RCA Company, whose factory is located in Taoyuan's Chupei area, was taken over by General Electric Company in 1986 and was again taken over by Thompson Company two years later. When Thompson Company purchased the factory, it was worried about pollution problems and asked U.S. environmental protection company [name indistinct] to take soil and underground water samples from the areas near the factory for examination in the United States. Results of the examination showed that the soil and underground water contained very high concentrations of volatile organic substances. Legislator Chao said Thompson Company planned to hold a news briefing to explain the pollution caused by General Electric. But it was worried that local residents might ask for

compensation, and so decided to seal off the wells and close down the factory. Chao Shao-kang said [sentences indistinct]. He said the land where the factory is located has been sold to China Electric Company and another company, who knew nothing about the pollution problem. Because the land is within the Taoyuan urban area, it might be developed into a commercial or residential area. To prevent more people from being harmed, Legislator Chao decided to expose the fact. He said both Thompson and General Electric are well-known companies throughout the world and they did pollute Chinese soil. After making pollution money for nearly 30 years, they sold the land at a profit—their behavior is quite contemptible. In addition to asking the government to sue the two companies at the International Court, Legislator Chao also hoped the EPA will immediately look into how serious the pollution is. He also hoped the PHA will conduct epidemic diseases examination among local residents so the government can assist them in demanding compensation from the two companies. [end recording]

Official To Talk to U.S. on Wildlife Sanctions

OW3105083394 Taipei CNA in English 0734 GMT 31 May 94

[By Y. C. Tsai]

[Text] Taipei, May 31 (CNA)—Sun Ming-hsien, chairman of the Council of Agriculture (COA), will visit the United States in late July to talk with American officials on trade sanctions against Taiwan for illegal rhino horn and tiger bone trade, council officials said Tuesday [31 May].

The COA head will meet with officials of the US Department of the Interior and some wildlife conservation groups, the officials said [words indistinct].

While Taiwan is set to face US import prohibitions on wildlife specimens and products, they noted, it is hoped that the United States will shorten the sanction period.

The office of US Trade Representative released a list of proposed import bans on Taiwan wildlife products in late April following an order by President Bill Clinton earlier that month.

The import bans, which are mandated under the Pelly amendment to the Fishermen's Protective Act of 1967, are expected to be put into practice in mid-June.

Taiwan products targeted for US import prohibition include shoes and handbags made from reptile skins, jewelry made from coral, mussel shells and bones, edible frogs' legs, live goldfish and tropical fish for the aquarium trade, and bird feathers.

The COA officials held optimistic views about a shorter sanction period, saying the prospect will be better if the legislature passes a series of amendments to the wildlife conservation act by the end of June.

Sun is currently accompanying Premier Lien Chan on a visit to El Salvador and Guatemala.

REGIONAL AFFAIRS**Southern Cone Environmental Issues Through 26 May**

PY2805022894

[Editorial Report] The following is a compilation of reports on environmental issues monitored through 26 May.

Bolivia

The Bolivian Forum on Environment and Development, Fobomade, charged that the indiscriminate cutting of trees such as the mara, oak, and other species makes them increasingly close to extinction in the Terevinto and Ayacucho cantons, adjacent to Amboro National Park, Santa Cruz Department. Fobomade Secretary General Loida Rodriguez said this situation is reflected in the increasing transportation of trees to various markets. (La Paz PRESENCIA in Spanish 14 May 94 p 6)

Alternative Development Under Secretary Raul Enrique Ugalde Castro stated that the Chapare region could disappear in 10 years because of deforestation and pollution, and that "urgent measures must be adopted to avoid this disaster." He said the "worrisome" exploitation of forests has reached an "alarmingly" irrational level. He noted that another "serious" problem is the pollution of rivers and the area as a whole. He said: "Coca maceration pits have contaminated everything," and that a study shows that 50 percent of the fish in Chapare are no longer fertile. (La Paz PRESENCIA in Spanish 18 May 94 p 1)

Paraguayan Ambassador to Bolivia Julia Velilla agreed that the Pilcomayo River is becoming a sewer due to the mineral waste spilled into it from dozens of mines. (La Paz Radio Fides in Spanish 1100 GMT 24 May 94)

Brazil

On 15 May, 2.5 million of liters of oil spilled from a pipeline linking the Almirante Barroso terminal with the Presidente Bernardes refinery in Cubatao. The oil already has affected the Parequecaba, Guaica, Cigarra beaches in Sao Sebastiao and the Clube and Saco da Capela beaches in Santos, Sao Paulo State. (Sao Paulo AGENCIA ESTADO in Portuguese 2340 GMT 19 May 94)

Approximately 10 metric tons of oil spilled from a truck owned by the Transomega Transportadora company that was parked in the company compound in Santos' Estuario neighborhood. The oil leaked into Channel 5 through rainwater pipes. Efforts are being made to prevent it from reaching the beaches. (Sao Paulo AGENCIA ESTADO in Portuguese 2340 GMT 19 May 94)

Air pollution has doubled in Sao Jose dos Campos. Lycia Maria Moreira Nordemann, National Institute of Space Research expert, reported that 85 micr grams per cubic meter of particles were detected in the air in 1993 compared with 1992 when it was 42 micrograms. She said that on 9-13 August 1993 the average air pollution was 190 micrograms per cubic meter. She added that only 25 percent of the air pollution is caused by local industry, and 75 percent by other regions of Sao Paulo. She noted that rainwater is registering very high acidity levels. (Sao Paulo GAZETA MERCANTIL in Portuguese 26 May 94 p 13)

ISRAEL

Report Says Coastal Aquifer Water Quality Deteriorating

TA3105104194 Tel Aviv HA'ARETZ in Hebrew
31 May 94 p C1

[Report by 'Amiram Kohen]

[Text] "If the salinization and pollution of the coastal aquifer continues at the present rate, the level of water salinity and pollution will by the year 2018 be such as to render 25 percent of the aquifer water impotable, while the salinity rate of over 50 percent of the water will be above the maximum recommended level." This is one of the findings of a report prepared by the Water Commission's Hydrological Service, due to be submitted to the Knesset's State Audit Committee today.

The coastal aquifer is Israel's largest reservoir containing about 400 million cubic meters of water—about one-fifth of the entire water quantity produced annually in Israel. In recent years, annual pumping from that reservoir stood at some 360 million cubic meters. The anticipated deterioration is the result of a rising nitrate concentration and from the salinization rate.

The report indicates that the coastal aquifer has been undergoing gradual salinization, and even today, about one-tenth of the water pumped from the reservoir (about 32 million cubic meters) comes from drillings ("cells")

whose salinity rate exceeds 250 milligrams of chlorine to a liter, which is the maximum recommended by official standards.

The coastal aquifer's rate of increase of nitrates concentration is about one milligram to a liter per year. Any nitrate concentration exceeding 90 milligrams to a liter disqualifies the water immediately, because it causes cyanosis in babies.

The report shows that even today, about one-fifth of the entire quantity of water pumped from the aquifer (about 64 million cubic meters) is produced from wells whose water has a nitrate concentration above the allowable norm, while about 60 percent of the water is pumped from drillings which have exceeded the recommended maximum of 45 milligrams per liter.

The report notes that the pollution rate is liable to be much more rapid because the estimates do not account for future changes in groundwater quality.

Water Quality Said Endangered by Autonomy Agreement

TA0106105394 Jerusalem Qol Yisra'el in English
1000 GMT 1 Jun 94

[Text] Water Commissioner Gid'on Tzur says that autonomy agreements could critically endanger Israel's water supply. In a briefing to the Knesset State Audit Committee, the commissioner said the country's water supply could be damaged by seeping sewage and industrial waste from the autonomous regions. He said he believes that Israel should have secured better guarantees for its water rights during negotiations.

REGIONAL AFFAIRS

Article Assesses Environmental Pollution by Black Sea Fleet

AU0606200094 Kiev HOLOS UKRAYINY in Ukrainian
1 Jun 94 p 6

[Unattributed report: "The Division of the Black Sea Fleet: "Who Owes Whom?"]

[Text] According to the data of expert analyses performed by specialists of the Ministry of Environmental Protection, the Main Ecological Inspection, and the corresponding services of the Crimean Republic and the city of Sevastopol in the framework of the fulfillment of Section II of Presidential Directive No.110/93 of 11 October 1993, total losses from possible economic consequences due to the presence of the Russian Federation's Black Sea Fleet on the territory of Ukraine will constitute 53 million karbovantsi a year. Every day, the sewage discharged, without purification, from the fleet's boats into the Sevastopol Bay alone amounts to 1,000 cubic meters.

The Black Sea Fleet fuel storage (Military Unit 62709) is the main polluter of the Sevastopol Bay with petroleum products. Subsurface water, soil, and the sea bottom have been polluted. Today, the Sevastopol Bay is practically dead. It must be cleared of metal scrap: About 30 ships, as well as munitions, spare parts, and so on lie on the bottom. One-third of all the land occupied by the Black Sea Fleet bases needs to be recultivated. There are four million cubic meters of contaminated subsurface waters. According to tentative expert estimates by specialists of the Ministry of Environmental Protection, the cost of the elimination of the harm inflicted on the environment as a result of the activity of the Black Sea Fleet units and facilities in the Sevastopol Bay constitutes \$3.432 million, and the total cost for all places where the Black Sea Fleet is stationed on the territory of Ukraine is \$17.160 million.

Yet another round of negotiations on the division of the Black Sea Fleet has ended without any results. The Russian side continues to insist on getting the shore structure of the Black Sea Fleet. The cost of the entire fleet is estimated at between \$5 billion and \$6 billion, whereas the ecological aspect of the problem is not even put on the agenda. Well, who must pay whom?

Central Asian States Face Potential Water Resource Conflicts

History of Water Wars

94WN0282A Moscow MOSKOVSKIYE NOVOSTI
in Russian No 18, 1-8 May 94 p 8A

[Article by Aleksey Kirichenko and Azer Mursaliyev under the heading "History": "Embargo on the Amu Darya"]

[Text] In a situation in which economic wars, energy embargoes and blackmail are becoming virtually commonplace and a daily occurrence throughout the entire post-Soviet space, it is quite clear that water is also acquiring

significance as a strategic raw material. And it is unlikely that various political forces will not want to take advantage of that fact. Especially since water wars are not uncommon in the history of Central Asia.

In the hot summer of 1850 a unit set out from Khiva in the direction of Staryy Urgench: Khiva's ruler, Mukhammed-Emin, had ordered the construction of a dam on the Sharkrauk. The Turkmen tribes that paid the khan a "blood tribute" by sending their young men to serve in his forces had rebelled. And Mukhammed-Emin decided to put down the revolt by depriving the "yomut bandits" of water. Dams were erected everywhere to cut the yomuts off from the water of the Amu Darya.

The yomuts took up arms. But the "water embargo" proved a powerful weapon. The yomuts were defeated and sued for peace. And in 1869 the khan allowed water to be released from the Amu Darya to the Turkmen lands through the Laudan Canal.

Yet a much more bitter and more protracted "water war" occurred in the region after the arrival of Russia and the massive introduction of cotton cultivation.

The 1920's. The Fergana Valley lies in smoke and blood. Red Army units are hunting down Basmaki units. A unit of Umar Ali's irregulars bursts into a village in Margilanskiy Rayon in the middle of the planting season. To punish the peasants for planting cotton the guerrillas cut down 54 people, and the rest were told that if they planted cotton again "a holy mound would be built with the villagers' heads." Umar Ali's "anti-cotton" sentiments were not the exception, but more likely the rule among the Basmaki.

Incidentally, the fight over cotton in Central Asia began before the Bolsheviks arrived. Prior to the revolution virtually all uprisings in Central Asia were preceded by peasants' refusal to plant cotton. Just as soon as the fields were sown with traditional crops alarmed czarist officials sent off secret dispatches to the capital. These were followed by the arrival of punitive forces...

It is a well-known fact that the Basmaki lost. For many years cotton was the deciding factor in the life of Soviet Central Asia, becoming a monoculture.

The region's ecological system has simply not been able to withstand the pressure of this monoculture. It is interesting to note that the traditional irrigation system of Central Asia, which according to scientists took shape in approximately the middle of the first millennium B.C.E., existed virtually without significant change for more than two millennia.

River Diversion Projects

94WN0282B Moscow MOSKOVSKIYE NOVOSTI
in Russian No 18, 1-8 May 94 pp 8A-9A

[Article by Aleksey Kirichenko and Azer Mursaliyev under the heading "Situation": "Water Wars"]

[Text] If you enter the Uzbekistan Ministry of Water Resources building, go up a marble staircase and flip a switch, you will see an electric "river" flow from the Ob

River into the Central Asian deserts. This "Diagram Map of Ob-Irtysh Water System Diversion to Central Asia" was built in the 1980's, and apparently built to last.

A curious metamorphosis: it seemed that the plan to divert northern rivers had finally been buried almost 10 years ago. Outraged articles in NOVYY MIR and the closing of the intelligentsia's ranks against changing the course of rivers proved the obvious to everyone: decisions on super-projects, no matter how alluring they might seem, are most often made without consideration for the long-range effects of introducing the particular boon of civilization in question, whether it be the greening of the Sahara or a dike across the Bering Strait...

The USSR Ministry of Water Resources was shut down with great pomp.

Yet just as soon as the passions accompanying the turbulent breakup of the former union republics had died down a bit, new sprouts of old ideas once again struggled toward the light.

They Prefer To Discuss the Aral Sea in a Whisper

In the East, power is a matter of who owns the water, not the land. It is this simple idea that is demonstrated over and over at every historical juncture. Following that idea, Central Asia has already lost its struggle for power.

At one time it was supposedly concern for the region's socioeconomic development that justified the decision to carry out large-scale irrigation in Central Asia. Behind the slogans lay much simpler ambitions: the desire to earn huge amounts of money that were then successfully invested not in canal linings, but instead in individuals' own dachas and estates.

In the late 1950's, when the water balance was still being maintained, 64 cubic kilometers of water flowed into the Aral Sea each year, with 63 cubic kilometers of that subsequently evaporating. By 1980, as the result of the development of irrigation-based agriculture and increasing irretrievable water consumption, the water flow had fallen to 11 cubic kilometers. In 1985-86 not a single drop of water flowed into the sea.

In Uzbekistan alone canals extend 183,000 km. According to calculations done by Academician Aleksandr Yanshin, only two-three percent of those canals are reinforced and lined with concrete or other binders. That means that water is literally draining away into the sand. Experiments have proven that it only takes seven-10 cubic meters of water to irrigate one hectare of farmland, yet two or three times that much is currently being used.

The "third Central Asian river," the river of poor management and irrepressible ambitions, has created swamps and four million hectares of salinated, uninhabitable land that has been given a name that evokes nearby deserts: the Aralkum.

On its way to the Aral Sea the Amu Darya is quite simply drained to its very riverbed. Despite what geography textbooks say, it has long since ceased to flow into the sea

or, more precisely, what was once called a sea. Just as the Zeravshan River no longer flows into the Amu Darya.

The highest rate of infant mortality rate in the world is found in the Aral region, at 80 per 1,000 newborns. The summers have gotten hotter, there are 90 days of dust storms every year, and winters are colder—not just in Central Asia, but also along the lower Volga, in the southern Urals, in Western Siberia, Afghanistan, India, Pakistan...

In Uzbekistan I heard it said several time that "the death of the Aral Sea is an accomplished fact." The universal cries of "The Aral Sea can still be saved!" are supposedly misleading people, even though now is the time we should be urgently working on another problem that can still be solved: the problem of lands that must be saved from the "heavy breath" of the dying Aral Sea. But no one was willing to say that into a microphone—just in private, and then only in a whisper.

My trip to Uzbekistan coincided with severe high water levels, the thawing of mountain snows, and the inundation of areas adjoining rivers. I just could not understand how Uzbekistan could have a water shortage. Hydroelectric power station managers begged the Ministry of Water Resources to permit controlled discharges from overfilled reservoirs: if the water were released evenly, on several different occasions, then flooding could be avoided. But the Ministry of Water Resources had its own opinion about that, or rather it had its approved plans, which nature somehow never seems to take into account.

All rivers have a planned flow capacity. The Chirchik, for instance, can carry 1,000 cubic meters per second. But therein lies the rub: even if actually carrying only 700 cubic meters it floods all the adjoining dachas, roads and even enterprises such as the Tashkent Motor Plant.

If everyone is aware of these facts, then why is the problem of the Aral Sea portrayed as unsolvable? It would seem that what needs to be done is to reinforce the sides of canals, prevent water from running off into low-lying areas and lakes, regulate the watering schedule and, finally, follow long-standing cotton cultivation technologies that make it possible to avoid several unnecessary waterings...

It turns out that this is not the solution. In order to save a single cubic kilometer of water it would be necessary to pay (in Soviet prices) R2.5 billion [rubles]. It is perhaps for that reason that water resource managers are still obsessed with completely different projects.

The Most Cherished Dream of the Karakum

My interview with Georgiy Balayanets, chief expert with Uzbekistan's Main Administration for Water Resource Monitoring, was almost over when my interlocutor (up until that point very cautious in his assertions and assessments) stood up and, going over to a huge map of Central Asia, suddenly remarked: "The entire region's most cherished dream has been and remains the diversion of the Ob-Irtysh water system. Including for the purpose of saving the Aral Sea."

The Aral Sea was long ago entered in Uzbekistan's balance sheet as the price that had to be paid for "cotton independence," and it was said that this was just something that had to be accepted. Now people are reckoning which is cheaper: to conserve their own water or bring in "outside sources"?

A canal 2,320 km long, the brainchild of the Soviet Ministry of Water Resources, was assigned the glorious mission of saving the Aral Sea from death and solving the problems of a rapidly growing region (incidentally, it was the demographic justification that was promoted as primary). It was assumed that with the aid of Siberian rivers it would be possible to find timely ways to provide food, employment and a positive environmental situation for future residents of Central Asia and Kazakhstan.

Work was done on this project by more than 100 union-level institutes, and the canal-digging machinery had already been purchased. On a human level one can sympathize with the planners, who spent years of their labor designing unique engineering projects. But did anyone ever stop to think about the kind of future awaiting the areas that were to be developed in the process of the canal building?

"It was proposed that 25 cubic kilometers of water be diverted to the south each year," says Academician Yanshin. "But that amount would not even be sufficient to maintain the Aral Sea's current level! Nevertheless they wrote that the water diversion would increase total agricultural yield by two-three percent in comparison to the 'Food Program'. Meanwhile, more than 20 percent of the crop is being lost during harvesting, transportation and storage—these are the untapped resources that could be going into water conservation and infrastructure development. And has anyone ever calculated how much it will cost just to operate the canal?"

But it appears there is no point in answering even these obvious questions, because Russia does not have the money to revive the river diversion project, and the prospects of the Central Asian countries and Kazakhstan doing so are even dimmer.

According to our information, in the early 1990's some Central Asian states placed this condition before the Soviet Government: they would sign the Union Treaty only if the northern river diversion project were revived. It appears they even got approval for that... But the Soviet Union collapsed, and the issue went away on its own.

Today the water problems of Central Asia and Kazakhstan are exacerbated by "feudal fragmentation." Everyone is his own boss. In the opinion of Aleksandr Yanshin, Kazakhstan's Lake Balkhash has been spared precisely because the lake does not have several owners, each prepared to take as much as they like and more than likely leave their neighbors without...

At the Ministry of Water Resources I was told in strictest secrecy about another astounding project developed by Uzbekistan's water resource managers. For several kilometers the Amu Darya flows along the border between

fraternal Turkmenistan and Uzbekistan. So why not shift the river's channel to Uzbek territory? Never mind that it would take more than a hundred pumping stations to divert the water to a new channel.

Incidentally, the Ukrainians, within whose territory Russian-owned gas pipelines are located, have already figured out ways to attach taps to them and siphon off fuel. Just imagine what would happen to a river from which one could draw as much water as one wanted without having to resort to any tricks...

Relations with Afghanistan are a separate issue. Right now a war is being fought "beyond the river," and water consumption there does not exceed three cubic km. But as soon as hostilities are over at least three times that much water will be needed.

When the Indus Flows to Central Asia...

But there is no plan to compare with an idea put forward by Nadzhim Khamrayev, director of the Institute for Water Problems, a division of the Uzbekistan Academy of Sciences. In his opinion, the "issue of water diversion is only tangentially related to the issue of saving the Aral Sea," no more than that. The most important thing is how to feed a growing population. How? Uzbek water specialists cannot stop thinking about the huge and, most importantly, unutilized water resources in the Indus River—220 billion cubic meters. Currently the institute headed by Khamrayev is promoting the idea of diverting a portion of the flow of rivers that rise in the Pamir-Tyanshan mountain range. This plan includes not only the Central Asian countries, but also Pakistan, Afghanistan, Iran and even India.

In the pages of the respectable Tashkent newspaper BIZNES-VESTNIK VOSTOKA the academician describes in detail three alternatives for diverting water from the Indus River to Central Asia. The first two options are technically complex, requiring the building of tunnels through mountains. But the third is supposedly deserving of "the greatest attention." The plan is to raise the water flow by 600-700 meters not far from the Pakistani port of Karachi, from which the water will flow by force of gravity across Pakistan, Iran and Afghanistan. At the Afghan-Turkmen border the water of the Indus would flow into the Amu Darya.

The proposed distance: 2,600 kilometers! Then we would have flowering gardens like the gardens of Semiramis, and heavenly groves of trees. The only thing not indicated is how much all this could cost and where the money will come from. Not to mention the political interests of the states involved in this "project"...

How About a Water Tax?

Academician Khamrayev never ceases to remind us that the solution to the water problems of Uzbekistan and all of Central Asia is not up to local governments, but rather Russia. It would be impossible to divert the Ob-Irtysh system without the consent of the Russian Federation. Just as it is impossible to resolve a single dispute involving water within Central Asia itself. It was toward this end that

the Interstate Water Management Council and the International Fund To Save the Aral Sea were established, with Russia participating as an observer.

Let us examine the "Decision by the Central Asian Heads of State To Establish Funding for the 'International Fund To Save the Aral Sea'," which was adopted in Nukus in January and signed on behalf of the Government of the Russian Federation by Yuriy Yarov. At first glance a quite unremarkable decision that merely states an intention and essentially decides nothing. The four Central Asian states and Kazakhstan pledge to pay up to one percent of their state budgets into a joint "water" fund. But thus far not a single sum-kupon, manat or tenge has been deposited in it. Kazakhstan's water managers have announced that they will go their own way altogether.

Back in the days of the USSR, Central Asia repeatedly returned to the idea of instituting a water tax, something that has been practiced since ancient times. Now this idea is making the rounds again. But today it would be even more difficult to implement. Now that each area is independent one can imagine the kind of money that Tajikistan, which is at war and essentially not working, or even Kyrgyzstan, might demand in payment for water from Uzbekistan, for example. Uzbekistan's annual water consumption is 115 cubic km, 105 of them flowing out of neighboring mountains.

The World Bank has also gotten involved in saving the Aral Sea, but only one condition: that the "Decision..." be immediately amended to exclude Point 8, which mandates (albeit in a very cautious and Eastern way) "the implementation of a compilation of technical and economic studies pertaining to the issued of donor augmentation of rivers in the Aral Sea basin from external sources."

The World Bank was deferred to and the point dropped. But for how long?

Consequences of Diversion Projects

94WN0282C Moscow MOSKOVSKIYE NOVOSTI
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[Article by Aleksey Kirichenko and Azer Mursaliyev:
"Possible Consequences of River Diversion Projects"]

[Text]

Northern Diversion Regions

1. Flooding of farmland and timber land by reservoirs; rising ground water levels.
2. Damage to the fishing industry due to changes in the hydrobiological conditions of rivers.
3. Changes in the permafrost layer (primarily in Siberia).
4. Archaeological, historical and cultural damage as a result of construction and flooding (primarily in the northern European section).
5. Disruption of traditional ways of life and cultures due to the influx of tens of thousands of construction workers into sparsely populated areas.

6. Climatic changes along the shores of large reservoirs.

7. Changes in ice coverage and climate at the mouths of major Arctic rivers (due to reduction in water volume and thermal flow and changes in the river discharge schedule).

Southern Diversion Regions

1. Possible introduction of harmful aquatic species and diseases as a result of the merger of northern and southern watersheds.

Effects on an International Scale

1. Degradation of certain fish species of international significance (for example, the Atlantic salmon).
2. Effects of European water diversion on the hydrological, saline and biological condition of the Caspian Sea will affect Iran.
3. The tremendous amounts of diversion (200-300 cubic km annually) from rivers in the Arctic Sea basin that are possible by the next century could cause changes in permanent Arctic Sea ice cover (particularly in the Karsk Sea) sufficient to cause climate changes extending beyond the borders of the CIS.

Military, Political Implications

94WN0282D Moscow MOSKOVSKIYE NOVOSTI
in Russian No 18, 1-8 May 94 p 8A

[Article by Aleksey Kirichenko and Azer Mursaliyev under the heading "Projection": "A Gas Embargo Will Seem Like Nothing: The Environmental Undercurrent of the Military and Political Situation in Central Asia"]

[Text] Most dependent on external water resources is Uzbekistan, whose economy is almost completely dominated by a single crop: cotton. It is that monoculture that actually got the country "hooked" on the "water habit." Though it won "cotton independence" for the whole country, Uzbekistan itself fell into "cotton dependency." It is hardly likely that it will be able to get rid of it any time in the coming decades, as the peasants of Turkmenistan attempted to do in 1916 by refusing to plant cotton and going back to farming traditional crops. Over the years of its uncontested dominance, cotton monoculture has brought about significant changes in the very structure of society and even in people's way of thinking. Too many things in this republic, from agricultural to industry to politics, are connected with cotton. And the phrase "a monoculture requires a monogovernment" also works in the other direction.

The rivers that bring water to Uzbekistan originate in three neighboring countries: Tajikistan, Afghanistan and Kyrgyzstan. Today all these are much more dependent on Tashkent than Tashkent is on them. It is through Uzbekistan's territory that vitally important lines of communication to Kyrgyzstan, Tajikistan and the northern part of Afghanistan pass, and it is from there that they get the majority of the energy resources they consume. This in turn allows Tashkent to exert a certain amount of pressure on them. Yet theoretically these countries could put the

neighboring giant in a much more dependent position. And they could do it the same way the khan of Khiva once did against the rebellious Turkmen: by building dams across the canals that flowed to their lands. Or the same way that Turkey is doing at this very moment as it carries out a grandiose irrigation project in southeastern Anatolia. By building a network of dams and hydroelectric power stations on the upper reaches of the Euphrates and Tigris rivers and creating a chain of reservoirs in that region, Ankara now has a fairly powerful tool for exerting pressure on its southern neighbors—Iraq and Syria—and is now planning to export a new kind of raw material: water for the arid Persian Gulf countries and Saudi Arabia.

Uzbekistan's southern neighbors could utilize their water resources in precisely the same way. If that were the case, Tashkent could find itself in a situation in which Russia's "gas embargo" against Ukraine might seem like nothing by comparison. That fact is objectively transforming Uzbekistan's southern "near abroad" into a zone of strategic interests. And it is urgently forcing and will continue to force the government in Tashkent to pursue an active policy in the region to prevent the emergence there of hostile regimes that might be tempted to step on Uzbekistan's water lifeline.

Incidentally, it is precisely in that region and in that manner that the Tashkent government is operating as it maintains close contacts with Gen. Abdulrashid Dustum, the de facto ruler of northern Afghanistan, who has blocked attempts by the Tajik opposition to regain power. For fairness' sake it should be noted that even before the start of the civil war, in which Uzbekistan has intervened in various ways, the Tajik opposition held views that were, to put it mildly, definitely not friendly toward Tashkent or President Islam Karimov. This in turn made Uzbekistan's support for their opponents in the Tajik civil war quite logical.

However, the political situation in this complex region does not depend solely on the presence of Uzbekistan. And in view of that the presence of Russian troops and border guards in Tajikistan and its retention in the ruble zone, on the one hand, and persistent efforts to gain control over major Tajik and Kyrgyzstan hydroelectric power stations, on the other, appear in a completely different light, and not one favorable to Uzbekistan.

RUSSIA

Moscow Facility Set To Receive Radioactive Waste

PM0606152994 Moscow IZVESTIYA in Russian
4 Jun 94 p 1

[INTERFAX report: "Storage Center Near Moscow Ready To Receive Radioactive Waste"]

[Text] The Moscow Interregional Radioactive Waste Storage Center, sited near Zagorsk, is ready to receive spent ionizing radiation sources from states in the near and far abroad

We have learned from competent sources that deliveries of radioactive materials could begin once customs and financial issues have been settled.

Ecology Committee Deputy Asks for More Money

PM0706103794 Moscow NOVAYA YEZHEDNEVNAYA GAZETA in Russian 7 Jun 94 p 2

[Report by Andrey Ishchenko: "In Moscow They Are Asking the President for Money"]

[Text] Tamara Zlotnikova, deputy chairman of the Russian State Duma Committee for Ecology, has yet again urged the president to intervene personally in the state's ecological policy. "For the first time men's life expectancy has dropped below pension age, deformed children are being born, and Russians are on the threshold of irreversible changes beyond which the collapse of the state and the death of the peoples are possible," Zlotnikova wrote in her letter to Yeltsin.

Less than 0.6 percent of the expenditure section of the budget, or 0.15 percent of the gross domestic product, is earmarked for ecological programs. That has never happened in a single civilized or even not very civilized country, although the troubled and in places catastrophic nature of the ecological situation is obliging people to increase financing for environmental conservation at least to some extent. According to some figures, the ecological damage throughout the country in 1993 totaled 15 trillion rubles, and this year it is forecast at 43 trillion, which is over 40 times the expenditure envisaged on ecology in the budget.

Moscow Objects To Azerbaijan's Policy in Caspian Sea

LD0206175494 Moscow ITAR-TASS in English
1716 GMT 2 Jun 94

[By ITAR-TASS diplomatic correspondents Boris Krivoshey and Vladimir Taranov]

[Text] Moscow June 2 TASS—Any steps taken by any country of the Caspian Sea Basin with a view to get an advantage in terms of the sea's natural resources are at variance with the interests of the rest of the countries of the Caspian region.

This is how Grigoriy Karasin, spokesman for the Russian Foreign Ministry, answered to a question concerning memorandum on cooperation in the field of power engineering, which Britain and Azerbaijan signed earlier, at a Moscow briefing on Thursday.

According to Karasin, the memorandum provides for holding talks for the purpose of working out agreements on cooperation in the field of prospecting for and extracting gas and oil in various areas including the so-called Azeri sector of the Caspian Sea.

After the memorandum was signed, the Russian Foreign Ministry handed in a note to the British embassy, Karasin said.

According to him, Russia pointed out in the note that the bottom of the Caspian sea is not divided into sectors, because the sea is by nature a sole reservoir with a united ecological system and represents an object for a joint use. Therefore, all the countries of the Caspian Sea region must be involved in making decisions with regard of all activities, including development, prospecting for and making use of the relevant natural resources.

Ministry Aide Denies Talks on Storing Taiwan Nuclear Waste

PM0306133594 Moscow IZVESTIYA in Russian
2 Jun 94 p 3

[Sergey Agafonov report: "Taiwan Offers Nuclear Waste to Moscow"—last two paragraphs are IZVESTIYA conclusion]

[Text] Tokyo—A fresh piece of news has arrived from the prosperous island of Taiwan—Taiwan-Russian business contacts are threatening to take a major new direction provided the sides agree a price. It is a question of Taiwan's nuclear waste being stored on Russian territory for cash.

Chan Chunchen [name as transliterated], director of the Taiwan Power state corporation, on his return to Taipei after a 12-day tour of Russia, Sweden, and Norway, told reporters that fruitful talks had begun regarding the handling of Taiwan's nuclear waste in Russia. According to Chan, his partners in the talks were representatives of a certain research center who have 10 nuclear dumps on Russian territory under their jurisdiction. It is at these "capacities" that it is intended to process and store Taiwan's highly toxic waste products, provided of course that the financial side of the project is agreed to their mutual satisfaction.

The problem of nuclear waste from its nuclear power stations is an extremely pressing one for Taiwan. It is not only a question of vigorous protests from the population (during a recent antinuclear demonstration in Taipei, for instance, over 10,000 people came out onto the streets) but of the fact that the dumps are almost full to bursting. The largest "waste facility" on the island of orchids, for instance, will have to be closed next year, but Taiwan's three nuclear stations punctually produce 130 tonnes of radioactive waste every year and that has to be put somewhere.

Taipei has examined several options for resolving this problem or, to be more precise, several locations to which toxic waste could be sent—in particular there was a plan to organize storage in "greater" China and in Sweden. However Beijing did not respond to Formosa's alluring proposition. The Swedes resolutely refused. Then along came Russia—Taipei calculated that Russia's boundless expanses and its need for money should incline it to enter into constructive dialogue on this tricky topic. As you can see, their assumptions paid off—that is the conclusion at least that can be drawn from the brief report made by the head of the Taiwan power corporation on his work in Russia.

IZVESTIYA was told by the Ministry for Atomic Energy that there have been no talks regarding the possibility of burying Taiwan's nuclear waste in Russia. According to a senior ministry official, the Taiwanese tried to sound out the Russian side on this score during a recent scientific and practical conference on nuclear technologies in St. Petersburg. They were told that in accordance with current law and the president's edict Russia does not accept foreign states' nuclear waste for storage. Storage of spent fuel from nuclear power stations built abroad with Russian assistance is carried out on the basis of special agreements.

However the ministry official voiced the opinion that a deal with Taiwan could bring colossal profits and would enable Russia to resolve many of its economic problems.

Expedition to Sunken Nuclear Submarine To Begin Mid-June

PM0306143194 Moscow ROSSIYSKAYA GAZETA
in Russian 3 Jun 94 First Edition p 3

[Tatyana Smolyakova report: "Ecology: "Patches for the Submarine"]

[Text] In accordance with a presidential directive and a Russian Federation Government decree a routine expedition to the area where the Komsomolets nuclear submarine sank five years ago in the Norwegian Sea will go ahead 15 June through 15 August. The voyage is to be carried out under the direction of Russia's Ministry for Emergency Situations with the participation of a number of Russian Academy of Sciences research institutes, the "Rubin" maritime technology central design bureau, and the Defense Ministry.

We would remind you that there are an atomic reactor and two torpedoes with nuclear warheads aboard the submarine. The torpedoes pose the greatest potential danger: Each of them contains 3,200 grams of plutonium-239. Since the nose section of the submarine has been damaged seabed currents could destroy the torpedoes' casings. And then radioactive contamination of the water is inevitable. According to the most pessimistic estimates, this could happen in late-1995 or early-1996. And although most scientists and specialists do not share such a pessimistic forecast, they all agree that it is better to play safe. That is the purpose of the expedition.

There are three specific tasks—to hermetically seal the nose section of the Komsomolets nuclear submarine using special titanium "patches," monitor the radiation and environmental situation in the area, investigate the technical state of the submarine, and search for the rescue chamber.

A collegium session was held at the Ministry for Emergency Situations to examine the preparations for the expedition. It was acknowledged that the work is proceeding on schedule. The titanium "patches" have already been brought aboard the oceanographic ship Akademik Mstislav Keldysh. The intention is to fit them to the submarine using manned "Mir" underwater craft equipped with mechanical arms. In mid-June the ship will

leave Kaliningrad, go to St. Petersburg and then to Denmark and Norway, and start the actual scientific program 1 July in the area of the wreck of the Komsomolets. The preparation of a warship to ship freight and members of the expedition from Murmansk to the work area is being completed. Another oceanographic vessel has been chartered in Murmansk as backup for the operation.

During the coming voyage particular attention will be paid to environmental monitoring. Unique self-contained equipment will be set up in the area where the submarine sank from which readings can be taken regarding the state of the environment without the equipment's being removed from the water. This is extremely important in order to gain a precise knowledge of the situation and precisely forecast how it will develop.

The fact that hitherto monitoring has been by no means perfect has given rise to a mass of speculation over the problem of the Komsomolets. For instance, there has been plenty of supposition that the fishing catch may be contaminated as a result of a plutonium leak.

In theory that possibility is not ruled out. It is known that the plankton on which the fish feed spend the winter at a depth of 1,000 meters. Sometimes they go down to a depth of 1,500 meters and very small quantities as far as 2,000 meters. We would remind you that the Komsomolets is lying at a depth of 1,700 meters. Thus, there is a likelihood of the plankton and then the fish being subjected to radioactive contamination. But how great is it? That also has to be ascertained using the state-of-the-art monitoring apparatus, some of which has been developed by Russian specialists, some by foreigners.

What is more, one of the tasks facing the 1994 expedition is to rehearse the technologies for emergency and monitoring work in extraordinary situations in the oceans of the world.

This program will cost Russian taxpayers 4.625 billion rubles and [as published] \$4.1 million. But evidently this expenditure is worth it in order to prevent a possible nuclear catastrophe and stop speculation over the problem.

Need for Tax Reform With Environmental Focus Examined

94WN0289A Moscow *DELOVOY MIR* in Russian
No 95, 2-8 May 94 p 9

[Article by Professor Konstantin Gofman, managing director of the ecological-economic research area of the Russian Academy of Sciences Institute of Problems of the Market, under the rubric "Finances": "The Salvation of Nature Is in Tax Reform"]

[Text] "Rent and Taxes. New Approaches to Reforming Russia's Tax System." This was the title of the article in the weekly supplement to DM [*DELOVOY MIR*] of 17-23 January of this year. A number of pieces in later issues of the newspaper were devoted to the need for tax reform and its possible variants. Today the managing director of the ecological-economic research area of the Russian Academy

of Sciences Institute of Problems of the Market, Professor Konstantin Gofman, continues the topic.

Russia is in the throes of both an economic and an ecological crisis. Is a simultaneous and mutually linked approach to solving this situation realistic or, on the contrary, should the country's ecological normalization be postponed "until better times" and all efforts be thrown into economic revival?

The questions are by no means idle ones. The experience of Russian reforms shows that ecological priorities in our country are secondary not only in terms of their "official" status, but even in public awareness. The warnings of ecologists remain voices crying in the wilderness. Yes, it would seem, that is true: should we care about them now? Is it perhaps actually more sensible first to feed people (even with contaminated food and water) and activate the mechanisms of "market prosperity," and only then "read-just" them in the interests of protecting the environment? It is not without reason that among ecologists in rich countries the saying is common that "poverty is the chief polluter."

This problem is by no means a simple one, and there can be no simple solutions which are to be adopted.

Voices are now being raised (including in *DELOVOY MIR*) in favor of tax reform. I am certain: **this is precisely the lever which will link the needs for financial stabilization and market liberalization of the economy with the requirements of ecological normalization.** But something else is also clear: this reform cannot be done in one stroke. We need a long-term program of ecologization of the tax system; that is to say, its by-stage restructuring in the following basic directions:

- gradually increasing the role of taxes on the use of the natural resource potential in all tax revenue in the budgets of the subjects of the Federation and local budgets;
- expanding the base of natural resource taxation by introducing taxes on using the so-called assimilation potential of the environment;
- introducing excise-type ecological taxes on goods and services whose consumption involves higher ecological risk;
- expanding tax benefits for enterprises and organizations incorporating production of ecologically safe items or employing closed (low-waste) technological processes, as well as for physical and legal entities located in ecological disaster zones and in ecological crisis situations;
- restricting direct and indirect subsidization of types of economic activity which are natural resource intensive and dangerous to the environment.

Taxation can be ecologized without reducing total revenue in the country's financial system, but it requires planned redistribution of the tax burden among participants in financial relations taking into account the tasks of economic stabilization and the social, ecological, and political priorities of society in conditions of the transition period. A reduction in taxes on labor and capital, announced in

advance and carried out in stages, with a concurrent increase in the scope of natural resource taxation will stimulate structural reorganization of the economy to reduce its natural resource intensity.

Rental Income's Route into the Budget: Direct or Indirect?

At present the role of the tax on land and other natural resources in the state's aggregate tax income is negligible. In itself this circumstance certainly does not mean that most rental income from nature use remains at the disposal of owners or users of natural wealth. The socialization of rental income, that is to say, its accumulation in state and local budgets through the tax system, can be carried out on one scale or another even without a direct tax on nature use—through taxation of income of nature users and buyers of their output (progressive taxes on personal income and profit, excise taxes, and the like). But here rental income seems to lose its identity and mix with other income in the "common pot" of the state budget and as part of the income of taxpayers themselves after they pay taxes.

However, the method of socialization of rental income—as a direct tax (payment) for nature use or through taxation of income of nature users and consumers of their output—has a definite effect on the ecological character of taxpayers' economic decisions and ultimately on the nature of society's socioeconomic development.

The greater the extent to which state income is formed through land tax (in the broad sense, that is, taxes generally on natural resources) while correspondingly reducing taxation of labor and capital, the stronger the economic stimuli for developing production will be. In addition, turning land rental into the main source for financing social (state) expenditures complies with the principles of social justice, since land as nature's gift is the property of the nation rather than the product of labor and capital.

Of no small importance is the fact that taxation of land leaves many fewer opportunities for tax evasion than taxation of personal income and entrepreneurial profit.

And finally, the last but not the least important argument in favor of changing over to predominant taxation of natural resource potential. Such a change would mean increasing economic stimuli for full and comprehensive use of natural wealth, since nature-conservative investments of labor and capital would be relatively cheaper for entrepreneurs.

The Main Difficulty

What is holding things up? Why not change over, and soon, to the direct method of withdrawing rent into the budget? There are in my opinion profound reasons which rule out the possibility of transferring the focus in taxation to natural resource potential all at once.

Introducing a high tax on the use of land and other types of natural resources while correspondingly reducing other types of taxation would be a "neutral" measure in relation to the budget and taxpayers. But only on one condition—if

the natural resource intensity of the economic activity of taxpayers was even roughly the same for everyone. But in reality indicators of land use intensity, water consumption intensity, and volume of harmful discharges calculated per cost unit of output produced and so forth differ among various enterprises (depending on their sectorial affiliation, technologies used, and the quality of the fuel and raw materials used) by factors of 10's and 100's. That can be seen in the following table.

Differences in the Water Consumption and Ecological Stress Created by Harmful Discharges into the Atmosphere and Water Sources, calculated per unit of gross output*

Sectors Consuming Fresh Water	Water Consumption Intensity	Ecological Stress from Discharges	
		into the Atmosphere	into Water Sources
Ferrous Metallurgy	0.10	0.47	0.45
Nonferrous Metallurgy	0.07	0.45	0.05
Oil and Gas Sector	0.10	0.28	0.08
Coal Sector	0.12	0.98	0.85
Electricity Production	1.00	1.00	1.00
Chemical Sector	0.05	0.34	0.26
Building Materials Sector	0.02	0.93	0.36

*The electricity production sector's indicators are expressed as 1.

The table cites certain data which characterize the scope of this differentiation broken down by aggregated sectors of the multisectorial balance of the former USSR. It is obvious that the gaps in natural resource intensity will rise many times over when changing from the sectorial level to the level of specific taxpayer enterprises.

For now payment for use of the natural resource potential has little impact on the economy of enterprises, and differences in their natural resource intensity are largely nullified; while taxation, especially in the form of value-added tax, maintains the established proportions of distribution of national income.

The situation changes fundamentally with the transition to taxation of natural resource potential. The disparity in the tax burden which reflects the disparity in the natural resource intensity of economic activity will in the long run undoubtedly prompt taxpayers to cut back natural resource intensive production facilities or reduce their natural resource intensity. But a "shock" transfer, all at once, of the focus of taxation to natural resource potential, that is to say, establishment of a single payment rate for land and other natural resources of the particular quality and location for everyone, would inevitably result in the emergence of enormous disproportions in the withdrawal of income from enterprises with differing levels of natural resource intensity.

It is for that reason that a transfer all at once to taxation of natural resource potential while reducing other types of taxation accordingly could lead to an economic "collapse"

of economic systems which in terms of its negative consequences would exceed all the well-known results of the "shock" effect on socioeconomic processes. The natural resource system of taxation is incompatible with the "non-ecologized" economic structure of contemporary production and consumption oriented to the relative cheapness and availability of natural wealth.

It Is for the Regions To Decide

There is an important restraint on the development of natural resource taxation in the particular conditions of the Russian Federation. The receipt into the federal budget of rental income from using natural resource potential accumulated in the tax on land and other natural resources will to all appearances meet opposition from the subjects of the Federation and even provoke separatist tendencies. Consequently taxes not directly related to nature use, above all taxes on income of physical and legal entities collected at rates which are the same for the entire country, must maintain their significance as the main source of income of the federal budget. In contrast, revenue from taxes for using the natural resource potential of the corresponding territories must predominate in the income of the budgets of the subjects of the Federation and local budgets.

For at least two-three years into the future, large-scale ecologically positive changes cannot be expected in the sectorial, technological, and territorial structure of economic activity. It is hardly possible within this time to fundamentally increase financing of nature protection activity from budget system capital. In these conditions a by-stage redistribution of tax pressure on enterprises seems realistic: a reduction for ecologically safe types of activity and an increase for natural resource intensive ones. Until a market for the right to land use (land ownership and rental) is formed through a system of sale auctions of this right, it would be wise to grant the subjects of the Federation the right to determine the yearly **estimated value of land for the purposes of taxation**. As rough estimates show, if taxation of profit is limited exclusively by the needs of the federal budget, the tax rate on profit could be reduced to one-third of the present level. And here the amount of the land tax would be increased roughly 12-fold as compared with the existing level.

But of course the transition to such an assessment of land (as was said, specifically for the purposes of taxation) will not replace forming a mechanism for its market appraisal through the development of purchase and sale, security, and rental of rights to land use, but it may become the transitional link in bringing today's almost symbolic land tax rates closer to the market value of agricultural and especially urban land. The method of taxation itself is important here, in a percentage of the appraisal of the land rather than in fixed rates per unit of area. In principle this protects tax revenue from inflationary depreciation better.

The Problem of Appraisal

The enormous organizational-technical complications of the practical realization of this concept must certainly be taken into account. The concept presupposes a regular

reappraisal of land and other taxable natural resources as often as possible, necessarily excluding from this appraisal the market value of the real estate objects existing on it (the "pre-improvement" value of the land parcel) as well as rental income from capital investments which raise the long-term economic potential of the object of taxation (investments in prospecting for and exploring mineral deposits, in long-term improvement of agricultural land, in the engineering and social infrastructure of urban territories, and so forth). All rental income of this type (according to Marxist terminology, differential rent II) is income from capital rather than from land as such, and therefore may be excluded from the tax base when the land tax is calculated.

Even if all the methodological difficulties related to computing the "pre-improvement" value of land parcels are considered surmountable, it is obvious that the corresponding appraisal work will hardly keep pace with the constant and fairly rapid (as world experience shows) rise in the value of land and other natural wealth. Consequently the need for additional regulatory taxes on the profit of nature users, on the sale of land, on security transactions with land parcels, and the like will remain.

Information generated by the land market is essential in order to accurately determine the value of land as an object of taxation. The trouble is that when differential rent I is completely taken from land users, the land market is inevitably transformed into a real estate market for land and ceases to generate information on the pre-improvement value of land parcels.

Therefore, back in the early stages of the evolution of land taxation, there must be intensive development of land appraisal work oriented not only to the needs of city planning and agricultural land management (which was characteristic of the centralized economy), but also for the purposes of the formation, functioning, and tax regulation of the land market as part of the real estate market. This is a field of resource appraisal work which is fundamentally new to our country, and it is in dire need of scientific methods support and basic interdisciplinary research.

As for enterprises of the mining sectors, here the strategic direction should be a transition from a multitude of taxation systems (excise taxes, payments for the right to use the earth's interior, and deductions for reproduction of the mineral-raw material base) to a system of unified territorial taxes on the extraction of minerals. The object of taxation should be the usable volume of balance reserves of fuel and raw materials, rather than only the volume of saleable output as it is now. Then losses and expenditures for inhouse needs as well as the amount of reserves of minerals allotted to enterprises will be "reckoned in." Tax rates should be set in percentages of the value of the tax base in current prices with a differentiation depending on the geological-economic conditions of extraction.

In this case, the amount of the tax on the extraction of minerals will depend on three basic factors:

- 1) the level of prices for output being extracted,

2) the degree of completeness and intensiveness of the use of reserves, and

3) differences in the geological-economic conditions of extraction. This taxation procedure will encourage conservation of mineral reserves, which is extremely timely for enterprises working in favorable geological-economic conditions and at the same time ensures more complete accumulation of rental income in territorial budgets.

The Payment for Pollution

Since the late 1980's, Russia has been forming a unique system, with virtually nothing like it in world practice, of payments by enterprises of all forms of ownership for the discharge (run-off) of pollutants into the atmosphere and water sources and for waste disposal. Formed at the same time was a system of state nonbudget ecology funds whose basic source of capital was the payment for pollution.

Analysis of the results of the practical application of this system in 1992-1993 shows that the fiscal function of payments is being performed relatively successfully overall. Thanks to the creation of conditions for financing protection of the environment from the capital of non-budget ecology funds, independent of the budget, this sphere suffered to a lesser degree from the investment "cave-in" of 1992. While the total volume of investments in the economy declined by 45 percent in 1992, capital investments in environmental protection from all sources of financing dropped by only 20 percent. To a considerable degree the practice of exempting enterprises from payments for pollution based on the amount of capital they used to finance their own capital investments in environmental protection helped achieve this. This system must be improved by raising its incentive value.

From the editorial office: The number of Russian cities declared ecological disaster zones is constantly rising. This is the topic of the article by the DM columnist, Lyudmila Biryukova, "The Sword of Damocles Has Gone into Action," published on pp 30-31.

[Box No 1]

The subject of this article is essentially not just taxes. It is rather the transition from the "well-traveled" but dead-end road to a fundamentally new type of socioeconomic development. The difficulties of the transition are obvious. Unfortunately, as fundamental decisions are put off and palliatives are substituted, these difficulties merely intensify. In both cases society must pass between the Scylla of the socioeconomic upheavals of the transition period and the Charybdis of continuation of the old course.

But it must be resolved.

[Box No 2]

The author warns: We need a gradual increase in the role of natural resource taxation in the formation of state income, a role programmed for the long term and legislatively fixed, rather than an "avalanche" of restructuring of tax revenue all at one time...

Appeal of Members of the Russian Academy of Sciences to the National Leadership

947WN0235A Moscow VESTNIK ROSSIYSKOY AKADEMII NAUK in Russian Vol 63 No 9, Sep 93 pp 795-796

[Unsigned]

[Text] [Addressed to:] B. N. Yeltsin, president, Russian Federation; R. I. Khasbulatov, chairman, Supreme Soviet, Russian Federation; V. S. Chernomyrdin, chairman of the Council of Ministers—Government of the Russian Federation

The members of the Russian Academy of Sciences consider it necessary to draw your attention to the catastrophic situation into which the Russian environment has fallen. The environmental protection system, organized over the course of many years by several generations of leading scientists and practical workers and functioning quite successfully, is now being destroyed as a result of disintegration processes.

We are losing enormous natural resources. There has been a sharp increase in poaching, which is resulting in the mass annihilation of many species of plants and animals, including those listed in the Red Book and which constitute a national treasure of Russia. A barbarous looting of the country's national resources is in progress. Here are only several examples.

In the Far East during the postwar years it was possible to increase the numbers of the Ussuri tiger with great difficulty. However, recently it is being intensively exterminated by poachers: the skin, claws and whiskers of the tiger are highly valued in the countries of Southeast Asia (Japan, Korea, China), to which they also are frequently exported. The absolute freedom from prosecution for poaching activity is astonishing. Announcements of sale are not only posted in the streets of Far Eastern cities, but also are being published in the local newspapers and broadcast by radio. If decisive measures are not immediately taken for preserving the tiger it will disappear completely.

The Far Eastern leopard is on the verge of extinction: its numbers do not exceed 20-30 specimens; there is an immediate need for drawing up and implementing a program for saving this species. Bears are being annihilated in mass numbers; the principal reason is the extraction of bear bile, which also has a high value in the markets of Southeast Asia. There has been a sharp increase in the poaching of the izyubr and the Siberian stag: they are being killed off for their velvet-covered antlers and these also are being criminally exported abroad. During recent years there has been a 50% decrease in the numbers of the musk deer, being annihilated for musk gland of the males (musk stream); according to available data, the exportation is taking place in part through Estonia. The kill of the mountain antelope, which has been listed in the Russian Red Book, has increased by several times and now its total numbers are only 500-700 specimens. The kill of the Tatar antelope, whose horn is used in Tibetan medicine, has been virtually uncontrolled. Mutilated cadavers in the

hundreds remain in the steppe. On the Anadyr Plateau the mountain sheep, which only recently was quite plentiful, has been completely annihilated. In addition to individual species, many unique natural territories have been under the threat of annihilation.

Under different pretexts, even within the structure of environmental protection agencies, numerous commercial organizations are being set up which are engaged in the sale and export of animals and unique materials for collections, the organization of paid-for hunts and tourism even in reserved territories, which always was categorically forbidden.

At the International Conference in Rio de Janeiro (June 1992), held with the participation of the leaders of many countries, among the principal documents a Convention on Biological Diversity was adopted. It was written in the Convention that the states, having sovereign rights to their biological resources, bear responsibility for their maintenance and stable use. The Convention provides for the preparation by each covenanting party of a national strategy and program for maintaining and using biological diversity, implementing monitoring, adopting timely measures for the rehabilitation and restoration of degrading ecosystems and encouragement of research favoring maintenance and stable use of their biological heritage. A task of primary importance is ensuring the preservation of rare and disappearing species and ecosystems; their loss will be irretrievable. Russian biologists have worked out such a program and it should receive the status of a national program and be included among the programs of priority importance. Appropriate legislative acts for its implementation must be adopted within the framework of this program.

The scientists of the Russian Academy of Sciences feel that the need has long passed for establishing in Russia a unified national system for the protection and regulation of biological resources. The Ministry of Environmental Protection and Natural Resources of the Russian Federation should be the basic department for the organization of such a structure. There is a need for bringing up to the world level the area of specially protected natural territories (up to four-five% of the entire area of the country), ensuring adequate funding for their organization and management. All measures must be adopted in order that there be full implementation of the Edict of the President of the Russian Federation dated 2 October 1992, No 1155, "On Specially Protected Natural Territories in the Russian Federation" and the Law "On Environmental Protection," put into effect by a Decree of the Supreme Soviet of the Russian Federation dated 19 December 1991, No 2061-1.

We are hoping for your active participation.

Delay is out of the question.

Live Telecast From Sunken Russian Submarine Planned Soon

*LD3005160094 Moscow INTERFAX in English
1512 GMT 30 May 94*

[Text] Russia's Ministry for Emergencies plans to buy equipment that will make live telecast possible from the

nuclear-powered submarine Komsomolets that sunk in the Norwegian sea on April 7, 1989. There are two torpedoes with nuclear warheads, containing 3200 grams of 239-plutonium on board the vessel.

As was noted at a meeting of senior ministry officials in Moscow on Monday, all is ready for an expedition to the Norwegian sea. Specialists will sail on the Academician Keldysh from Kaliningrad on June 15 to complete their work by August 15.

They are to seal off the submarine's front section, conduct technical tests on the vessel and check its inflated safe chamber, lying on the sea bed six kilometers from Komsomolets.

The Deputy Director of the Federal Nuclear Center Arzamas-16 Stepan Kravchenko disclosed at the meeting that a new device would be installed on board Komsomolets to detect uranium and plutonium carrying weapons. This will make it possible to monitor the level of radioactive pollution continuously even after the end of the expedition.

Since it is very hard to say how the submarine will fare in the future, it should be sealed as quickly as possible, Kravchenko said.

The ministry expects the beryllium casings of the torpedoes with nuclear warheads to be destroyed through corrosion in late 1995 or early 1996.

As a deputy minister Sergey Khetagurov has told Interfax, yet another expedition to the Norwegian sea is planned next year to carry out the second stage of the sealing operation to make Komsomolets complete safe.

Experts Cite Need for 'Urgent Immobilization' of 'Komsomolets' Submarine

*94WN0281A Moscow NEZAVISIMAYA GAZETA
in Russian 20 Apr 94 pp 1, 3*

[Article by Andrey Bayduzhiy under the rubric "Danger": "Russia Has Little Time Left To Prevent a Nuclear Disaster: A Blowout of the Nuclear Filling of the Submarine 'Komsomolets' Is Becoming Increasingly Realistic" Designations "For Official Use" and "Top Secret" are as published in original Russian source.]

[Text] Two times already this year NEZAVISIMAYA GAZETA has dealt with the situation which has developed concerning the preparations for an expedition to the nuclear-powered vessel, "Komsomolets," which sank in the Norwegian Sea five years ago. These articles as well as the fifth anniversary of the vessel's loss which was observed attracted attention not just among the public but even in the departments whose sluggishness has almost caused the process of immobilizing the ship to break down.

The main administration of the RF Ministry for Emergency Situations (MinChS), which was responsible for organizing the expedition to the site of the "Komsomolets's" loss, hastily began to put together cadres. The first 300 million rubles [R], perhaps not a large amount but even so, perfectly real money, was allocated in early April to prepare the expedition.

But it is still too early to put the story of the "Komsomolets" to rest.

A Problem Which Does Not Exist?

In early April 1994, a number of mass information media all at once, each claiming to have been the first to receive the exclusive information, at first alluding to "a responsible employee of one of the ministries who asked to remain anonymous" and then directly indicating official sources in the MinChS, circulated a report entitled "Expert Analysis of the Condition and Prediction of Long-term Radioecological Consequences of the Accident and Location of the Atomic Submarine 'Komsomolets' on the Bottom of the Norwegian Sea." This document, which was part of the material of the 33rd volume of the archives of the former Committee for Conducting Special Underwater Tasks (KOPRON), was presented as a secret one, and thus had been inaccessible to journalists and the public. In addition to the technical data on the "Komsomolets's" condition, it cited the calculations of a number of experts regarding the probable development of a radioecological situation near the sunken vessel. In their calculations, the authors came to the conclusion that even if the plutonium from the warheads of the torpedoes was washed out, no more than 30-400 square kilometers of the bottom would be contaminated and the radiation doses on the distant borders would be "very negligible." On that basis the conclusion was drawn that given "the absence of economic damages from the atomic submarine's being there in its sunken state for a long time," there was no need to "conduct expensive work to seal off the reactor bay and the torpedo tubes." And so the developers of the document proposed abandoning any work on the "Komsomolets" at all, limiting it to nothing but radioecological monitoring at the site where the vessel had sunk to "lessen the social-psychological and political tension surrounding this problem."

The report which made its way from the depths of the MinChS to the press served as a basis for the publication of almost sensational materials on the day of the fifth anniversary of the loss of the "Komsomolets." According to them, the vessel which sank in the Norwegian Sea does not pose any realistic danger and the threats related to it are strongly exaggerated. But the fuss raised by the mass information media concerning the vessel forced the MinChS to declassify the report, it became clear. At the same time, it was alleged that there was no problem of the "Komsomolets" as such and there was no reason to upset the population about it.

The 'Secret' of Volume 33

The truth that the most plausible lie is a half truth is as old as the world but no less true because of that. A half truth can be created by putting forward certain facts and hiding others. It is precisely this device which the authors of the premeditated information leak used by releasing the "secret" document to the press. But the facts cited in it are only a part of the truth. The other, which was concealed from journalists but is undoubtedly familiar to the MinChS leadership, is that practically right after its appearance in 1993, the report with such a favorable prognosis was sent for

an expert study at the All-Russian Scientific Research Institute of Experimental Physics (VNIIEF). Its results dispelled the unfounded optimism. In verifying the methodology of the calculations, it turned out that the authors began from false premises by significantly exaggerating the speed at which the plutonium would dissolve and separate out in sea water. The underwater currents which increase the contamination spot to 100-1,000 kilometers and a whole number of other factors were not taken into account. In a review signed by S. Voronin, the chief designer of VNIIEF, Yu. Trutnev, the first deputy scientific manager, and other specialists of the institute, the calculations cited were declared wrong and inadequately substantiated, while the conclusions on the need to abandon work to prevent radionuclides from getting into the surrounding sea were found to be "premature." The need to immobilize the vessel's nuclear ammunition as quickly as possible was confirmed once again. The document subjected to an expert study was sent to the archives, while KOPRON, which still existed at that time, began to make preparations for an expedition to immobilize the corroding warheads of the nuclear torpedoes in the summer of 1994.

But the rejected finding did not lie in the archives for long. In January 1994, KOPRON was disbanded and its functions transferred to MinChS, which was created then and for a long time forgot about the "Komsomolets's" existence. But after the articles published in NEZAVISIMAYA GAZETA, the MinChS was immediately required to justify its inaction which put the expedition to the Norwegian Sea on the verge of failure and the long-ago report issued to journalists as the "secret of Volume 33" was brought to light. For greater persuasiveness, its materials were accompanied with the classifications DSP [For Official Use] and "Top Secret" [as published]. The logic of the authors of the artificial information leak was simple: Since there was no unanimous opinion regarding the degree of danger related to the "Komsomolets" even among experts, it was hardly worthwhile to hold the MinChS leadership responsible for stopping work in this direction.

The Specialists' Unanimity

In fact there is no disagreement among serious scientists and specialists regarding further actions with the "Komsomolets," and there never has been. All of them, and the KOPRON materials have as many documents which confirm this as you might want, favor immobilizing the vessel's destroyed nuclear ammunition as quickly as possible. Here are the opinions of certain highly respected experts.

Academician N. Laverov, vice president of the Russian Academy of Sciences: "After reviewing the materials presented for the expert study on the issues of eliminating the consequences of the accident on the 'Komsomolets' nuclear-powered vessel, the Russian Academy of Sciences deems it necessary... in 1994 to work to seal off torpedo tubes Nos 5 and 6, which contain nuclear ammunition."

Yu. Vishnevskiy, chairman of Gosatomnadzor Rossii [Russian Federal Oversight of Nuclear and Radiation Security]: "We consider it necessary to develop technology and carry

out the operations work to seal off the nuclear ammunition in order to prevent the plutonium compounds from spreading into the environment."

S. Grigorov, chief of the RF Ministry of Defense Administration of Ecology and Special Safety Equipment: "In order to eliminate the radiation leak of plutonium from the two destroyed nuclear warheads... we consider it necessary... to seal off their internal spaces and the nuclear-powered vessel's forward end as a whole."

V. Kononov, the RF first deputy minister of atomic energy, F. Gromov, the commander in chief of the Navy, and A. Pogodin, the RF first deputy minister of protection of the environment and natural resources, gave similar conclusions. It is worth mentioning here that the specialists' assessments cited were delivered in September-October 1993, even before a new form of existence of plutonium in the form of suspended particles, macrosols, was found in the water samples taken at the site of the accident, and they made the radiation situation near the vessel even more menacing.

All these expert opinions were placed in the last, newest volumes of KOPRON archives, which total 82 volumes. In accordance with the edict of the president of Russia on declassifying ecological information, the documentation kept in it was never closed and, at least before being handed over to the MinChS, remained accessible not only to specialists but to interested journalists as well. Of the thousand documents contained in the archives, only a few bore the classification "For Official Use," which, considering the former top secret treatment of the "Komsomolets," was perfectly explicable. So one must certainly not speak of the "secrets" of Volume No 33 and other volumes of the KOPRON archives. Incidentally, the MinChS leadership might not have even known that, and it was for that reason that they began to leak information which was not in keeping with reality, holding back the findings which refuted their conclusions.

A Latent Danger

Another myth created to justify the uselessness of rendering the "Komsomolets" harmless was the allegation that its nuclear filling was too small to do any substantial harm to the environment. To support this, statistics which say that as a result of testing Soviet nuclear weapons alone, 54,000 curie of strontium-90 and cesium-137 fell into the waters of the Barents Sea, while radioactive waste whose total radioactivity exceeds the "Komsomolets's" "baggage" by a factor of 10 has been sunk in the seas and oceans.

The inaccuracy of such comparisons is that they are talking of altogether different elements. Cesium and strontium, which are formed as a result of nuclear explosions and the operation of atomic reactors, are classified as so-called short-lived elements. Their half-life does not exceed a few years and in dispersing into the atmosphere over enormous expanses of ocean or slowly seeping out from rusting tanks, they are incapable of resulting in any marked increase in the radiation background. The plutonium contained in the nuclear ammunition of the "Komsomolets" is something else. Its half-life is 24,000 years. Besides, plutonium is

classified as an extremely toxic substance, 10,000 times more toxic than arsenic. So getting into sea water, it represents an enormous danger. Even if the "Komsomolets's" filling is compared with the discharges resulting from nuclear weapons experiments, according to expert calculations only 100 curie of plutonium ended up in the Barents Sea during the entire time the experiments were conducted on Novaya Zemlya. But the vessel's torpedoes contain 4 times as much—430 curie. A blowout of them during a short time in one place can lead to truly catastrophic consequences.

But the danger related to plutonium by no means stops there. As everyone knows, this element does not have beta and gamma ray activity. And it takes several months to identify its inherent alpha ray activity using existing instruments. This means that it will be impossible to efficiently monitor the level of radioactive contamination of the Norwegian Sea and the fish swimming in it. A device which could do this, unlike any other in the world, is just now being developed by the specialists of Arzamas-16. By order, incidentally, of KOPRON itself.

How Much Does a Disaster Cost?

How much can the radiation disaster, if it does in fact occur, cost Russia and the entire world? NEZAVISIMAYA GAZETA [NG] has already written about how the region of the "Komsomolets's" loss is one of the most biologically productive in the Norwegian Sea. The vessel lies at a depth of 1,700 meters, which is exactly where plankton winter and then with their seasonal migration rise to the surface and serve as food for fish. Moreover, the hydrochlorides and hydroxides of plutonium, combining with the products of the corrosion of other metals, form macrosols which can be carried to fishing industry regions by strong vertical and horizontal currents. All these facts were confirmed in the report of the Polar Scientific Research Institute of the Ocean Fish Industry and Oceanography imeni Knipovich and are well known to ichthyologists. In October 1993, V. Korelskiy, the chairman of the RF Committee on the Fishing Industry, gave his finding on the amount of probable damage: "The 'Komsomolets' nuclear-powered vessel [NPV] which sank is a potential source of long-term radioactive contamination of the northern seas, which naturally may involve Russia's losing its traditional fishing industry. It is difficult to assess the negative consequences of the disaster for the fishing industry economy, although preliminary estimates of the possible damage during the five-year period totaled an astronomical sum—more than R3.5 trillion in 1993 prices." Any commentary here is hardly necessary.

Incidentally, Russia will bear losses not only from the reduction in its extraction of fish. The Norwegian Sea is traditionally a zone of Norway's ecological interests, and if just one cod netted has traces of isotopes of plutonium of manmade origin, an international scandal will erupt. The scale of it will exceed many times over the complications which arose after Russia dumped just 0.38 curie of liquid radioactive waste in the Sea of Japan. The fishing companies of the United States, Japan, and France, for whom this will be a fine opportunity to supplant the competitive Norwegian firms in the fish market, will not let the passions

die. A Norway which has lost its market will have nothing left to do but demand that the annual losses in the hundreds of millions of dollars be reimbursed by Russia. And the Russian government, according to international sea law, will have to pay them.

Not Raise, but Immobilize

A radiation disaster in the Norwegian Sea can be averted only one way, by sealing off the nuclear torpedoes in the forward end of the NPV. The option of raising the vessel was rejected by specialists back in 1991. There were many reasons for this, the main one being that the vessel's hull is virtually destroyed. In addition, because of the fact that the speed of corrosion of the steel near the titanium hull of the "Komsomolets" is 10 times more than usual, the bolts which reinforce the lid of the atomic reactor are most likely already ruined, and it is lying virtually free on the base. If the vessel were tilted even slightly, and if it were raised that is almost inevitable, the reactor's lid would slip off and spill its radioactive filling into the water. But even if the vessel could be raised absolutely vertically, the result would be the same. Because of the differential in pressure inside and outside the reactor and the gas residue in the high pressure system, when raised its contents would in fact gush as if pumped into the sea.

In 1993 KOPRON specialists developed a plan for immobilizing the vessel by which all the openings in its forward end would be closed off. It was planned to insert a special chitosan-based sorbing compound in the interwall space, and a special batch of it was manufactured by the Committee's order. On 4 January 1994, the plan was handed over for an ecological expert study, and six days later, in connection with the creation of the MinChS, the Committee was disbanded and all the work to make preparations for the expedition to the Norwegian Sea stopped. The departure of the research ship "Akademik Keldysh" to sea with "Mir" deep water equipment on board was open to question for the reasons which NG has already written about. And, as the story concerning the information "leak" which threw the Russian and international community into confusion showed, the MinChS leadership responsible for rendering the "Komsomolets" harmless was more concerned with hiding its own inaction, lack of professionalism, and negligence than with preventing the coming disaster.

Meanwhile, the expedition can be conducted this summer only by starting preparations for it in the coming days. Urgent measures are needed. A specially authorized organ consisting of truly competent specialists, most importantly ones with an interest in solving the problem, could carry those measures out. I. Spasskiy, the general designer of the Rubin Central Design Bureau, T. Borisov, the former chief of KOPRON, Yu. Kormilitsyn, the chief designer of the "Komsomolets," and a whole number of prominent experts have expressed their agreement to work on immobilizing the vessel without pay.

KOPRON or the MinChS?

The story of the "Komsomolets" has another side as well. In early 1994, when KOPRON was disbanded and its tasks charged to the Ministry for Emergency Situations which was

being created, almost all the submariners and designers of seagoing equipment lodged protests against this reorganization. And the point is not even that, as for example O. Ilyin, who supervised both these structures in the government apparat, warned, such a reorganization would almost certainly result in delay and breakdown of the work on the "Komsomolets." KOPRON, which in nine months of its work managed to conduct a unique study of the "Komsomolets" and recruited 42 domestic enterprises, most of which were part of the military-industrial complex which is undergoing conversion, to cooperate had every chance of becoming the world leader in the area of deepwater work. There is a very great need for such work on the international market, and the operation to immobilize the "Komsomolets" automatically creates unprecedented publicity for the organization that does it and ensures orders for many years into the future. It is precisely for that reason that a consortium of Dutch firms is so eager now to receive the contract to immobilize the vessel with the aid of the international fund in memory of the "Komsomolets." And the disbanding of KOPRON buried the hopes of many Russian defense workers to use it to resolve the problem of their conversion. This measure proved to be doubly wrong for the additional reason that sooner or later Russia will all the same have to create such an organ. A considerable number of dangerous objects have been sunk near its shores, including 8 atomic reactors, almost 24,000 tanks of radioactive waste, and hundreds of thousands of containers with toxic substances and chemical weapons. They all have to at least be monitored if not raised. These are perhaps not immediate tasks, but all the same they are tasks for the future. But now it is important to conduct the operation to immobilize the "Komsomolets" as quickly as possible. The vessel lying in the depths of the Norwegian Sea represents a real danger, not one devised by panicky specialists and journalists after a sensational story. Russia has little time left to eliminate this danger.

Zaveryukha Speaks of Russian Environmental Problems

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in Russian 0842 GMT 2 Jun 94*

[By ITAR-TASS correspondent Nikolay Vykolov]

[Excerpts] Stockholm, 2 Jun—The second day of Russian Deputy Premier Aleksandr Zaveryukha's visit to Denmark began with a speech at a meeting of environmental protection and finance ministers of the countries of eastern and central Europe. [passage omitted]

The reduction in industrial production, A. Zaveryukha noted in particular, has not led to a corresponding reduction in environmental pollution in Russia. One-fifth of the population lives in conditions where there is a permanently high level of air pollution, and there has been no improvement in the quality of drinking water. Research into the consequences of the Chernobyl accident show that the border of the zone with soil contaminated with radioactive caesium-137 in excess of one curie per cubic kilometer has increased by 8.8 square kilometers. This zone today includes the territory of 17 oblasts.

The increase in soil erosion—which affects 56 percent of agricultural land in differing degrees—is particularly worrying. [passage omitted]

Lack of Environmental Laws an Unresolved Problem

94WN0290A Moscow NEZAVISIMAYA GAZETA
in Russian 17 May 94 p 6

[Article by Abram Ioyrysh, doctor of juridical sciences, and Yuriy Rogozhin, candidate of technical sciences, under the rubric "Ecology": "Russia's Nature Protection Legislation Far From Perfect: A Problem Which Must Not Be Put Off"]

[Text] Judging crimes guided not by the law but by one's own concepts of law and justice is a characteristic Russian feature. But juridical VUZes [higher educational institutions] do not teach one to judge "by conscience," since this is a direct path to arbitrary action.

But it is precisely this path which Russian law enforcement is forced to take when investigating nature protection offenses. There are several reasons for this. In the former USSR, essentially there is not a single nature protection law. In 1986 the unlucky managers of the Chernobyl AES were tried not because an enormous amount of territory was contaminated and removed from economic use as a result of the accident at the installation entrusted to them. The directors of the power plant and the main engineer were convicted of negligence in performing official duties. With such a definition of their actions, they could count on amnesty, and that in fact occurred several years later.

Only in late 1991 was a strictly ecological Law "On Protecting the Natural Environment" adopted for the first time in Russia, which by now was free. This law devotes a great deal of space to altogether new provisions on ecological monitoring, the ecological expert study, and an economic mechanism for protecting the environment.

The law moved environment protection from the departmental level to the level of a global, national, and state-wide problem with priority status. But the direct effect of the law was complicated by the vagueness and lack of specificity of some of its language, which gave room for departmental enactments and interpretations.

Many of the law's provisions even now need refinement. The structure of power and government and regional policy have changed and the very approach to defining ecological safety and ecological damage has changed. Obviously, certain provisions of the law, especially the parts dealing with the rights of the subjects of the Federation, the economic mechanism, and accountability, should be expanded.

Articles on the ecological expert study are virtually infeasible in practice because the question of whether experts who prepare the finding are officials and on some level bear responsibility for the expert study's results has not been decided. The articles devoted to the right of citizens to a good environment are also poorly worded, and as a result judges cannot apply these articles in practice.

Disputes on the amount of damages caused by military actions and interterritorial disputes may become unique. The law should designate a rigid Russian position regarding foreign violators of the law's articles.

The question arises of what is worse, a bad law or the complete lack of one. We have already written that for many years the USSR was the only state in the world which used atomic energy extensively for both peaceful and military purposes without legal foundations for doing so. That is precisely how the lack of even one law regulating the use of atomic energy in the country can be described. (It is precisely for that reason that the legislative organs of the former USSR must bear a share of the blame for the Chernobyl disaster.)

No matter how paradoxical it may seem, the situation with the lack of atomic legislation has in fact not changed today. True, in 1993 the Supreme Soviet adopted three "atomic" laws in the first reading: "On the Use of Atomic Energy," "On State Policy on the Handling of Radioactive Waste," and "On the Status of Territories Contaminated as a Result of Radiation Disasters." The October events in Moscow and the breakup of the Supreme Soviet prevented the final adoption of these laws. And the new Federal Assembly, it seems, is not yet interested in atomic legislation.

So, legal support of protection of the natural environment is clearly unsatisfactory in Russia. What should the law enforcement organs do in this situation and how should law-abiding citizens behave?

The simplest thing is to ignore the issue, alluding to the need to resolve more important problems first. Indeed, we must not forget about the worsening economy, growing crime, and many other misfortunes which have befallen poor Russia. That is all true, but we must not resolve the problems listed one at a time. They are closely related to one another and they can be resolved only as a set.

But, on the other hand, we should not step up work on economic problems on the basis of the old technology. For following the unfortunate tradition, departments may formulate laws "to suit themselves," restricting themselves to empty declarations and not taking the interests of all citizens into account. For these reasons the State Duma must not transfer the power of legislative initiative in resolving ecological problems to executive organs.

But until the paternal lawmakers give us adequate ecology law, nature protection organs and individual citizens are permitted to live and act according to their consciences. If it works out...

KAZAKHSTAN

Pollution, Ecological Problems Deteriorate in Almaty

LD0206174994 Almaty KAZTAG in Russian
1325 GMT 2 Jun 94

[Summary] Almaty has a great chance of becoming one of the most polluted capitals in the world in the near future. This sad fact was stated by Bulat Yesekin, the head of the

city directorate for ecology and bioresources in an interview with our correspondent. The state has not allocated any money for the improvement of Almaty's ecology either in the current or last year. Even the external budgeting fund for protection of nature, which used to finance several important programs, will be used by the government for other purposes.

The city needs new roads and traffic controls because the number of cars in the capital increases annually by a third. The quality of gas leaves much to be desired. The life of catalysts, which were used to purify car exhausts, expire very quickly nowadays. The city has two power engineering units that are very unsafe ecologically.

The president of the republic issued an edict last year on urgent measures for the development of Almaty, in conformity with which the Ministry of Power Engineering and Fuel Resources was to provide its Almaty enterprises with low-ash coal and low-sulphur fuel oil, but the only thing that the ministry has done is to persuade the government to set flexible norms of air pollution. This has only worsened the situation.

The city and the oblast do not have special sites for storing toxic waste. The recycling of garbage needs improvement.

These problems become even more topical in view of the mountains surrounding the city. Our capital has no natural ventilation. Currently, Almaty leads as a city with the most polluted air in the republic, ranking second to Leningrad, which is the largest industrial center. It is not by chance that the population in Almaty ranks second to no one in the number of diseases of the respiratory, cardiovascular, nervous, and urogenital systems. Their health is also affected by the fact that the soil in the city and subsoil waters are noxious.

UKRAINE

Commission Estimates Damage From Black Sea Fleet Pollution

LD3105220394 Kiev UNIAN in Ukrainian 1545 GMT 31 May 94

[Text] Kiev—Valeriy Sirenko, deputy head of the main ecological inspectorate at Ukraine's Environmental Protection Ministry, told a UNIAN correspondent on 31 May that the joint commission of the Environmental Protection Ministry, the Defense Ministry, the State Oil and Gas Committee, the State Housing Services Committee, and the Academy of Sciences of Ukraine representatives—the commission of which he is in charge—completed preliminary calculations with regard to expenditures required to restore the environment damaged as a result of activity by the Black Sea Fleet. The sum of this damage is around 19.6 billion dollars.

An approximate four billion dollars is needed to resolve the ecological problems of Sevastopol alone, with 108

million dollars required specifically to regenerate 2,016 hectares of land in places where Black Sea Fleet units and facilities are deployed and to decontaminate the soil saturated with petroleum products.

Account should also be taken of expenditures required for cleansing the harbors to remove oil and other harmful substances that are constantly being dumped into the sea and to improve the health of the population that is being affected by the ecological calamity.

Sirenko said: "The state of the environment around Sevastopol is infernal. Harbors are polluted with trash and oil. The fleet's oil collectors are defunct. The command of the Russian Black Sea Fleet, however, has failed to find time to meet Ukraine's Environmental Protection Ministry commission."

Ministry Warns of Environmental Damage From Naval Activity

MK0106114094 Moscow SEGODNYA in Russian 1 Jun 94 p 5

[Konstantin Parishkura report from Kiev in the "Ukraine" column: "An Ecological Aspect Has Emerged in the Black Sea Fleet Division Problem. Damage by the Russian Navy Could Amount to 53 Billion Karbovanets a Year"]

[Text] The Ukraine Environment Protection Ministry has issued a report saying that \$17.16 billion is required to clean up environmental pollution caused by Black Sea Fleet units located on Ukraine's territory. According to the ministry, in the Sevastopol bay alone vessels dump approximately 1,000 cubic meters of untreated sewage water every day. The main pollution source in the Sevastopol bay is a fuel tank. Underground waters, the soil, and the sea bed are contaminated. In some parts of the bay the depth of toxic deposits reaches 40 meters.

The Sevastopol bay is virtually dead. Approximately 30 ships, as well as ammunition and spare parts, are lying at its bottom. One-third of the land occupied by fleet bases needs recultivation. The volume of contaminated underground waters is approximately four million cubic meters. In the event of the fleet's division in the proportions envisioned (18 percent of vessels to Ukraine and the rest to Russia), according to the Environmental Protection Ministry, the Ukraine Main Ecological Inspectorate, and the corresponding services of the Republic of Crimea and Sevastopol city, the environmental damage from the Russian Navy on Ukrainian territory will amount to 53 billion karbovanets a year.

The Ukrainian Environmental Protection Ministry has demanded that the ecological aspect of the problem be taken into consideration in sharing out the Black Sea Fleet because neutralizing the effects of the fleet's activity exceeds the cost of the fleet itself by three to three and a half times.

AUSTRIA

Austrian Recyclers Threatened by Low Prices

94WS0327B Duesseldorf VDI NACHRICHTEN
in German No 15, 15 Apr 94 p 4

[Article by Peter Kudlicza: "It's Touch and Go with the Austrian Recyclers: Financial Crisis in Packaging Recycling"]

[Text] VDI-N, Vienna, 15 April 1994 - Six months after the Austrian packaging ordinance was put into effect, private industry's ARA collection and utilization system has become stuck in the same kind of difficulties as its German counterpart DSD (Dual System Deutschland) did earlier. Environmental Minister Maria Rauch-Kallat (Austrian People's Party) has been inundated with criticism both from the opposition parties as well as from the coalition party—the Socialist Party of Austria. Meanwhile, the "industrial branch recycling companies" are teetering precariously on the brink of bankruptcy.

The efficient use of packagings and the reuse of packaging waste, which today in Austria amounts to about 1.5 million tons, are the goals of the Austrian packaging ordinance. It obligates suppliers to take back the sales and transport packagings and either return them to the original supplier, reuse them, or otherwise utilize them. Businesses can free themselves from this obligation by concluding a license contract with Altstoff Recycling Austria AG (ARA) and paying a license fee. In exchange for which, ARA takes over the packaging waste materials and finds ways of utilizing them.

This initiative, under the motto "less government-more private industry," came under ideological crossfire almost immediately. The Social Democrats would prefer governmental regulation with a packaging duty rather than a system run by private industry.

The problems manifested themselves in early February. Austria Glass Recycling (AGR), an affiliate of ARA responsible for the collection of used glass products, found itself on the verge of financial collapse with a budgetary deficit of 70 million schillings. At the same time, ARA was already rumored to be threatened by a billion schilling deficit in its budget. The head of ARA, Christian Stiglitz, complained that "no one could realistically expect that a project like this, which in its first six months has undergone such growth, would be immune to some developmental disruptions." The development of the "Mega Project," he continued, has proceeded most promisingly to now. In just six months, some 6,000 companies throughout Austria have contracted with ARA. In the case of Germany, only 15,600 contracts had been signed in three and a half years.

The first balance sheet, published on 1 March, showed a brisk income of about 2.2 billion schillings (DM 315 million), for 1994. Another 300 million schillings are expected this year through the acquisition of new license partners, so that about 2.5 million schillings instead of the

originally planned 4 million schillings, are available for collection and utilization purposes.

Christian Stiglitz asserts that the main reason for the "current income shortfall" is the large number of "free loaders," i.e., companies that take advantage of the ARA system without paying for it. Sharp action will now be taken against such companies. In cases where new cost estimates are the problem, rate charge restructuring will have to be considered.

In view of the crisis, Socialist Party member Josef Cap is demanding that "the packaging ordinance be lifted for an unspecified period of time so that the ARA can reexamine its operating conditions." As in Germany, the system is on the brink of bankruptcy because of inadequate control- and sanction-mechanisms.

Franz Floss believes that the present disposal system is not able to fulfill its own ecological intention of damming up the flood of waste. The spokesman of the Greens fears that the consumers will be called upon to make up for the losses.

On the other hand, Environmental Minister Maria Rauch-Kallat hopes that the ARA will be able to save some 700 million schillings (DM 100 million) through replanning. The difference remaining to close the 1.2 billion schilling deficit in the ARA balance—only 500 million schillings—could be realized through discounts and deferment of payments of the disposal operation (200 million schillings), advance payments and liability transfers to the economy (200 million schillings, and other similar measures taken by the cities and communities.

GERMANY

Hungary To Return Toxic Waste To Germany

AU0306171994 Berlin DIE WELT in German 3 Jun 94
p 2

['DW' report: "Hungary Sends Back Toxic Waste to Germany"]

[Text] Budapest—Hungary is sending back to Germany toxic waste that was shipped there illegally by a German-Hungarian firm in June 1993. The waste stems from chemicals, paint residues, and other dangerous substances from a closed-down plant of the former GDR. After news of the illegal transport had been received, the approximate 200 tonnes of waste were placed in temporary storage in Hungary. It was said in Budapest that those responsible for the toxic waste scandal cannot be made answerable for it because the relevant legislation contains loopholes and the persons responsible have disappeared. The toxic waste, which Germany is getting back "after long talks," is to be handed over at the Austro-German border. Storage and transport costs amount to about 170,000 marks.

In 1993, Lower Saxony exported almost half its toxic waste to other German laender and abroad. Altogether, some 417,562 tonnes of special waste were disposed of, said the general manager of the Lower Saxon Company for the Disposal of Special Waste, Schulze-Rickmann, yesterday.

In addition, there were several hundred thousand tonnes of toxic waste that were disposed of by producers internally.

New Laender To Produce Own Environment Satellite System

AU0406143194 Berlin NEUE ZEIT in German
30 May 94 p 12

[Report by Reimund Westmeier: "New Laender Want To Build Their Own Satellite"]

[Text] Berlin— The German Agency for Space Flight Affairs (Dara) wants to support the development and construction of a satellite by the new laender. The small satellite, called "NBL-Sat," is to be primarily used for gathering information on environmental damage in the new laender from space. Speaking at the ILA 94 international aerospace fair at Berlin-Schoenefeld on Saturday [28 May], Dara General Director Jan-Baldern Mennicken said that he envisages concentrating the resources available to eastern Germany on this project.

The plan is in line with Dara's goal of commercializing space flight and achieving the greatest possible benefits for the economy with the help of a state-subsidized space program, explained Mennicken.

Last year, Dara and the European space agency Esa provided 52 million German marks [DM] to the new laender, the sum being distributed among 29 industrial companies, 14 research institutions, and eight universities. The space budget for the new laender amounts to just DM80 million and is thus less than 4.4 percent of the total budget, says Ralf Joachim, the head of the Dara coordination bureau.

Speaking to NEUE ZEIT, Klaus Berndt, head of space technology sales at the Jena-Optronik GmbH, said that with the NBL-Sat project, Dara has finally stopped applying "the principle of giving everyone a slice of the cake." With this new plan, which will involve the participation of nine eastern German space technology companies and institutes, Dara will be able to show something concrete and will have an opportunity to demonstrate that it is acting in the interest of the laender. Berndt stressed that the participation of eastern German companies in the satellite project would serve as a reference for them. There were no doubts in his mind about their competence with respect to space distance measuring and analysis technology, as well as optical sensors. To develop the new satellite, one will, of course, need the support of companies in the old laender, but know-how and technical means are abundantly available in eastern Germany.

Klaus Meyer, the executive director of the Freiberg Space Sensor GmbH, who initiated the project, assumes that the NBL-Sat project will use up about 50 percent of the space research funding available to the new laender. He expects the costs to reach a maximum of DM100 million over the next four years. The sum is tiny compared to the benefits to the environment. Thus, it might finally be possible to shed some light on radiation levels in Saxony's mining region. Meyer said that Saxony would have been able to

launch such a small satellite project by itself if Dara had not become involved. However, with Dara participation, the use and benefits of such a satellite can be extended to all five new laender.

Discarded Munitions Now Recognized as Environmental Hazard

94WN0254B Duesseldorf VTI NACHRICHTEN
in German No 13, 1 Apr 94 p 20

[Article by Birgitt Riese: "Disarmament in the Soil: Discarded Munitions Now Recognized as Environmental Hazard"]

[Text][First para is editor's summary] VDI-N, Duesseldorf—Over 7,000 sites in the Federal Republic are suspected of being polluted with weapons and munitions from two world wars and with toxins from military exercises. The road to cleaning them up is a long one—indeed, the authorities have only begun to find all the sites. There is a lack of tested methods for dealing with the poisoned inheritance.

Mustard gas, Tabun, Clark, phosgene: chemical weapons are a chapter of German history that is still far from being closed. "Munitions dumps in the Federal Republic were not recognized as an environmental problem until the 80's," as Andre Dahn of the BC Berlin Consult GmbH in Berlin recently explained at a professional meeting of the Offenbach environmental institute. On 13 January 1993 the Federal Republic signed the international chemical weapons convention, which among other things also requires the destruction of chemical weapons.

But it is not only wars which left explosive traces in the soil. Over 1,000 Soviet army properties and almost 2,000 posts of the former National People's Army are heavily polluted with all kinds of military discards, such as munitions, kerosene and oil. NATO troop exercise locations which are to be used by civilians can be added to the list.

It took a long time for the Federal government to consider the legacy of two world wars. It was the end of 1993 before the Federal Environmental Department in Berlin (UBA) published a study in which sites in Germany suspected of having discarded munitions were included. The list gave 4,336 sites on which discards from munitions production or unsecured storage places for war material could be located. But the experts of the UBA are far from being able to say which materials are polluting the soil and the groundwater and to what degree. "The study is based on researches in archives and thus represents a purely historical and descriptive summary," as Manfred Kurka, expert advisor on suspected toxic waste sites, explains.

Some Federal Laender have launched their own initiatives in the meanwhile. In Lower Saxony, for example, an interagency task force set up by the Land government presented an initial survey as early as 1988. In mid-1989 the environmental agency in Hannover began systematic risk evaluation, investigating more than 400 suspected sites so far. The investigation itself involves four steps. Preliminary research provides initial data on the status of

a possible munitions dump, including location, use and owners. In checking and documenting, archival materials, contemporary eyewitness reports, aerial photographs and geological conditions are consulted, interpreted and evaluated. Then in the preliminary investigation soil samples are taken and groundwater measurement locations are set up. The last step is the detailed investigation with increased sample density and more precise analyses. The final result of the investigations is a status report which states the potential risk of a given site.

It turns out that in Lower Saxony the suspicion of toxic waste was not confirmed in about half of the sites. The other approximately 200 locations are more or less highly contaminated; further investigations are planned. For five suspicious sites it has been established that must be cleaned up, secured or at least watched. According to Hans-Juergen Rapsch, report leader for discarded munitions in the Lower Saxony department of the environment, the risk evaluation alone has cost the Land DM45 million so far. For the cleanup of particularly problematic sites costs in the hundreds of millions are anticipated. These are amounts which the Land cannot raise alone. "But the Union does not feel responsible for discarded munitions," Rapsch reports regretfully. A discarded munitions financing law drafted by Lower Saxony which had clearly been supported by the Federal Council died in the Bundestag at the beginning of 1993. It provided for the Union participating more in cleanup costs.

But financing is not the only problem. The question of how discarded munitions can be cleaned up at all has not yet been answered. Therefore, a model cleanup is to be carried out in Stadthellendorf in Hesse which will be supported by the Federal Research Department. At the site of the largest explosives factory in the Second World War the soil is contaminated with trinitrotoluene (TNT) and production chemicals. The Lurgi Environmental Participation Company GmbH in Frankfurt wants to use its Deconterra process, in which the soil is washed and the toxic concentrate is then burned.

But the project, which was started in 1990, is suffering delays. "The soil-washing plant probably cannot be started up until the beginning of 1996," says Birgit Hofmann, press spokeswoman in the Hessian department of the environment. She says that at the moment another hazard evaluation is being carried out for built-up parts of the area and a cleanup plan is being set up.

The investigation and evaluation of suspicious sites is to be facilitated by special computer programs. Thus the Industrial Plant Operating Company (IABG) in Ottobrunn has developed a model for the evaluation of hazards posed by military sites and discarded munitions (MAGMA). There is information stored in the data bank about 227 chemicals, particularly those specific to munitions. Both the toxicity of the substances and environmental factors like precipitation, flora and soil type enter into the evaluation. The result of the calculations is a so-called M value between one and ten, which expresses whether the potential hazard is small or a site must be treated urgently. MAGMA has been used so far to investigate suspicious sites on the

former property of the western group of Soviet troops. At the moment, according to Hoppe, it is still in the programming phase, but within a few weeks it should be possible to install MAGMA in the computer.

Since March of 1993, in a project supported by the Federal Research Department at the former explosives factory at Tanne near Clausthal-Zellerfeld, the IABG has been investigating whether microorganisms can deal with TNT in the soil. The first result of the investigations is that bacteria present in the soil do metabolize TNT, but in the process they form substances which either have not yet been analyzed or are equally poisonous.

For most war material the only method so far has been burning. But so far there is only one plant for it. The military science department (WWD) of the Federal army in Munster has been running a two-chamber furnace since 1980 in which so far 75 tons of pure war material have been destroyed. Since the furnace only achieves temperatures up to 1200 degrees C, toxic arsenic is only inadequately bound. Thus a second furnace is planned, construction on which is to begin this year, according to Hermann Martens, group leader in the WWD. This furnace is to operate according to the Swiss plasmox procedure. At temperatures up to 1600°C, which are achieved with the help of an arc light, the arsenic-containing material vitrifies. Toxins are then washed out in such small quantities that according to Martens the slag can be used as a building material.

Express Method for Identifying Old Plastics Described

94WN0262A Duesseldorf VDI NACHRICHTEN
in German No. 14, 8 Apr 94 p 18

[Article: "Used Plastics Identified in Seconds"; Sub-head: "Infrared Identification System Improves Recycling Quality in Automobile Recycling"]

[Text] Wiesbaden, 8 April 1994—Whereas it is already possible to sort packaging plastics using detectors that operate in the infrared mid-range, so far rapid identification of the large number of engineering plastics has not been feasible. Black inked or highly filled types in particular have created problems. It has now been possible to resolve this problem under a joint project of the Development Group for the Recycling of Plastics [EWvK] in Wiesbaden together with Bavarian Motor Works [BMW] in Munich, plus the European Automobile Manufacturers' Joint Research Committee and Bruker Analytical Measurement Methods in Karlsruhe.

At the "Recycle '94" trade fair in Davos, 14-18 March, and at the 23-24 March annual meeting of the Association of German Engineers [VDI]-K [expansion not given] in Mannheim, the project partners demonstrated the new detection system for rapid identification of plastics. According to EWvK, it is possible with a rapidity measured in seconds to distinguish 23 different types of plastics and blends in all known modifications using the equipment developed by Bruker. To do so, it is necessary for only one second to hold the pieces needing identification to a measurement window and activate a foot switch. In three

seconds the result shows up on the monitor. Prior processing of the pieces is only required if they are painted or underwent surface treatment. Removal of the paint using a finger milling-cutter or a conical pin-type milling-cutter, ranging over only a 10 millimeter [mm] diameter, is sufficient prior preparation for the sampling.

Bruker's original piece of equipment has been undergoing testing for months at the BMW disassembly center in Landshut. According to EWvK, the experiments have gone so well that the sorting of the plastic pieces using disassembly manuals that has been performed until now in Landshut, has undergone replacement. The plastics are now separated by means of the identification system. Already during the test phase, there has been a definite decline in the contamination of pure sorts of materials through mis-sorting.

High Salt Content Still Found in Werra, Weser Rivers

94WN0262B Duesseldorf VDI NACHRICHTEN
in German No. 14, 8 Apr 94 p 23

[Article by Michael Peter: "Werra and Weser Remain Salty"; Subheads: "Despite Production Breakthrough in Potash Industry Rivers Not Recovering as Much as Expected"; "Salt Load Supposed to Be Cut in Half Again by 1995"]

[Text]Duesseldorf, 8 April 1994—The Werra and Weser are supposed to become living rivers again. The production breakthrough in the Thuringian potash plants was only the first step along the way. The salt content of the rivers can be scaled back to a tolerable level by means of interim salt storage underground and modern production processes.

For a decade, Federal Republic of Germany [FRG] and German Democratic Republic [DDR] representatives negotiated over the introduction of salt into the Werra and Weser. Lower Saxony's environmental minister, Monika Griefahn, retrospectively sums up the failed endeavors: "The DDR authorities at that time simply were not interested in a solution." The change and production breakthrough in Thuringia's potash plants instantaneously yielded what politicians did not succeed in doing: the Werra and Weser will continue henceforth to be spared immense loads of salt.

In peak periods the Werra was twice as salty as the North Sea. In 1988, from second to second, 226 kilograms [kg] of chloride were still being introduced into the Werra, as attested by measurements at the Gerstungen water depth gauge. Since then, to be sure, the chloride load has diminished by about two thirds. But even this easing of the pollution is still not enough to establish even merely approximately ecologically wholesome conditions in the flow of the Werra and Weser rivers. Stephan von Keitz of the Hessian environmental ministry puts it clearly: "As long as there is a potash industry in Germany we will not be able to convert the Werra into a fresh water river."

In order to reduce the salt load to a tolerable amount and to keep the salt concentration constant, the laender bordering the Werra/Weser and federal environmental ministry are applying 70 million German marks [DM] to

finance the construction of temporary storage sites for saline solutions at the East German potash centers of Merkers and Unterbreizbach. On weekdays the reservoirs are filled with salt water that is flushed into the Werra on "salt-free" weekends.

Additionally, in the future underground storage of saline solutions in geological cavities of the dolomite slab is supposed to be used in Thuringia too. In Hesse the "subterranean bathtubs" are used as final storage sites for the saline effluents, whereas in Thuringia they are supposed to be used as temporary storage. If the Werra carries less water, the "tubs" are filled with saline solution. When more water is being carried the liquid effluent from the potash production is then pumped into the river. Hence the Werra in the final analysis is not spared a single ton of salt but the concentration of chloride can be kept constant. In this context, Juergen Hulsch, a water expert in the Lower Saxony environmental ministry, comments that the "buffering of the salt shocks" may often be more important for the Werra's and Weser's biosystem than the absolute salt load.

An attempt at temporary underground storage is supposed to begin this week. The appropriate Thuringian water authorities still have not granted approval. They are afraid that the drinking water will be put at risk by the temporary submersion. Earlier in Hesse, slightly salty, standing water showed up in the cavities at the surfaces where the saline effluents of the potash industry were submerged.

While only the salt concentration in the river can be kept constant using temporary storage, modern production processes make it possible to reduce the salt load much more effectively. Currently in Thuringia, potash (potassium chloride, KCl) is washed out. In a second wash cycle kieserite (magnesium sulfate) is separated from rock salt (NaCl). Hans-Joachim Scharf, an employee of Kali und Salz AG in Kassel explains: "Such washing of kieserite accounts for the accumulation of large quantities of saline effluents." The flotation process solves the salt separation much more elegantly: tiny air bubbles on the surfaces of the kieserite crystals give buoyancy to the kieserite. "It can be siphoned off as foam, while rock salt accumulates as solid residue and can be stockpiled," is Scharf's description of the process.

The flotation process common in West German potash plants is now also being applied in Thuringia. On the other hand, the situation is otherwise with the electrostatic raw salt separation process [ESTA] that Kali und Salz AG has been using for a long time in West Germany. In the mostly effluent-free ESTA process, the different electrostatic charge of the salt minerals contained in the raw salt is exploited. In the initial stage rock salt is separated from the other salt minerals. In subsequent stages kieserite is separated from potash. Alfred Heinz, a chemist and potash specialist in Thuringia's environmental ministry, believes that high costs account for the ESTA process not being used in Thuringia's potash plants.

Two-thirds less saline effluent results from the ESTA process. The other side of the coin is that the salt has to be

stockpiled. According to Scharf, nearly 10 million tons [t] of waste salt were stockpiled in West Germany in 1992. Four million tons of salt were buried or introduced into the Werra. Clearing the stockpiles and compressing them back into the mines that have been worked is in fact possible and even done occasionally. According to Scharf, however, it is now universally feasible for economic reasons and would signal the end of potash production. The same argument applies to a solution proposed as early as the mid-seventies: creation of a salt-water pipeline from the Werra directly into the North Sea.

Actually, the international potash market is marked by overcapacity and declining earnings. Mining in the German pits is steadily waning: between 1988 and 1993 total German demand dropped from 5.8 million t of K₂O to three million tons of K₂O. Hence, more potash was produced in the GDR than the merger of Kali und Salz (west) and Mitteldeutsche Kali (east) is at present jointly producing.

Despite all the economic difficulties the endeavors of the laender bordering the Werra/Weser and the federation are pointing the way. Accordingly, the chloride presently being introduced into the Werra has to be reduced from nearly 70 kilograms [kg]/second [s] to 40 kg/s by 1995. Over the medium term this value should be cut in half once more. In terms of concentration this signifies 2,500 milligrams [mg] of chloride per liter of water in the Werra at the Gersungen water depth gauge in 1995. In this connection chloride is merely the principal parameter for analysis, the actual amount of salt totals nearly twice as much.

Federation and laender want to achieve a value of 500 mg/liter [l] for the Weser. Hulsch emphasizes: "As a result we will get just below the threshold of biological disruption. That would be tremendous progress considering that the Weser has now been virtually dead." Still, even then the city of Bremen would not be able to derive any potable water from the Weser since, according to potable water guidelines, the chloride concentration is not allowed to exceed 200 mg/l.

North Sea Nutrients Said to Be Near Exhaustion

94W'N0262C Duesseldorf VDI NACHRICHTEN
in German No. 14, 8 Apr 94 p 23

[Article by Rainer Antkowiak: "North Sea on Verge of Nutrients Collapse"; Subhead: "Bordering Countries Still Have Hardly Reduced Their Nitrogen Inputs"]

[Text]Duesseldorf, 8 April 1994—The North Sea is no longer supposed to be a catch basin for pollutants. In the past it was with statements of this kind that numerous conferences of North Sea border countries concluded. So far few deeds have ensued from the words.

"Although the situation has improved, the North Sea remains a major headache," openly admitted federal environmental minister, Klaus Toepfer, when he submitted his report on water management in Germany at the United Nations Water Day on 22 March in Noordwijk in the Netherlands. He thereby obliquely alluded to what environmental ministers have been asserting for a long time:

resolutions by the North Sea border countries to halve their inputs of pollutants by 1995 relative to 1988, have so far entailed few effective measures.

With an average depth of only 80 meters [m], the shallow sea with the highest density of shipping in the world is forced to ingest large quantities of nitrates, phosphates, heavy metals, organic halogen compounds and oils. According to the federal environmental ministry, statistically, 75 tons [t] of mercury, 355 t of cadmium, 950 t of arsenic, 4,500 t of copper, 11,000 t of lead, 28,000 t of zinc, 50,000 t of phosphorus and as much as 1.4 million t of nitrogen reach the North Sea annually via tributaries and via the air. More than one million tons of the nitrogen arrive directly via the rivers and nearly 400,000 t are airborne.

That is not without consequences. With increasing frequency, as a result of an oversupply of nutrients, it leads to algae blooms and oxygen deprivation. Ecosystems along the coasts are often disrupted. A study produced on commission from the environmental foundation World Wide Fund For Nature [WWF-Germany], "Nitrogen Inputs into the North Sea catchment Area," by the Hamburg Institute for Ecology and Policy [Oekopol], deals with the causes of the "overload of nitrogen" in the North Sea and measures for its reduction. Author Sabine Winteler emphasizes: "The report elucidates the manifold untapped scope and potential for a long overdue reduction of the turnover of nitrogen in the industry and industrial agronomy of the North Sea border countries."

Summarized briefly, the conclusions are: agriculture bears the responsibility for more than 50 percent and traffic for another 20 percent of the nitrogen pollution of the North Sea. Total inputs of nitrogen have remained steady at a high level for years. Only drastic measures can help the North Sea any longer.

The most important objective is refashioning agriculture into ecological farming. Toepfer takes a similar view in his report on water management in Germany: "Because of the largely closed cycle of materials ecological farming especially deserves support in problem areas for water management." He advocates designing subsidies and taxes in the agricultural sector more stringently than hitherto so as to support the goals of water protection.

The major sources of nitrogen from agriculture are animal production and soil cultivation. With the changeover to labor-saving mass ownership of animals there was more intensive use of liquefied disposal of manure. In Winteler's words: "The resulting liquid manure has a high content of rapidly available nutrients." More than 75 percent of the nitrogen from liquid manure is available to plants immediately or rapidly and therefore is capable of not being carried off into the North Sea. Lutz Ribbe, director of the environmental policy section Euronature, of the European Nature Heritage Foundation, remarks, however: "Only 20 percent of all fattened pigs in Germany are in hers of more than 400 animals." In the Netherlands and Great Britain by now 50 percent and 75 percent, respectively, of the swine are.

Manure activities outside the vegetation period are especially disastrous, leading to high losses of nitrates in the subsoil. Nitrates are hardly bound up there and mostly get into the ground water, the rivers and ultimately the North Sea. Not only the liquid manure but also the mineral fertilizers spread on the fields ultimately end up here. According to Winteler: "In 1980 the amounts of artificial nitrogen, an average 130 kilograms [kg] per hectare, applied in the former laender of the FRG were five times as much as before World War II."

Experts in the federal environmental ministry also are aware of how important a more economical use of fertilizers is. For a long time a bill has been lying dormant there for an ordinance on the use of fertilizer, that will prevent excessive use of fertilizer. Hardly anyone, however, expects it to be passed any longer in this term of the legislature. In any event, there was no word of mention about the ordinance in Toepfer's water management report at the end of March.

Dioxin Found in Smelter Waste

94WS0327A Duesseldorf VDI NACHRICHTEN
in German No 15, 15 Apr 94 p 3

[Article by Michael Peter and Christa Friedl: "Dioxin from Metallurgical Works: Industrial Facilities Seen as Dioxin Source"]

[Text] VDI-N, Duesseldorf, 15 April 94 - The dioxin question has taken on a new life. For years, waste incineration plants were branded the main source of such pollutants. Now iron and metal producers are being examined more closely. However, the mechanisms for dioxin formation are still not clear.

Although Dietrich Schulz, a staff member in the Berlin office of the German Federal Environmental Agency, has had a lot of experience with dioxins, he admits that "further surprises with dioxins cannot be excluded in the future" and that "we have consistently underestimated existing sources". No sooner had one dioxin source eliminated than another pops up. Last year the dioxin detectives, after first examining the waste incineration plants, then focussed their attention on sintering plants. The results of measurements far exceeded the worst expectations of the examiners. For example, the sintering plant of the Hoesch-Westphalia Works in Dortmund showed a dioxin value of 43.2 ng pro m³ of exhaust air. Another facility even recorded 70 ng/m³! By way of comparison, in 1990 the maximum value for dioxin emissions from new incineration plants was set at 0.1 ng/m³.

The dioxin values found in Dortmund not only alarmed the city residents but have also embroiled Klaus Matthiesen, the North Rhein Westphalian environmental minister, in the scandal. He apparently let these alarming measurement results gather dust in his office desk drawer for six months. His ministry had even sounded an all-clear in late December. The emissions from the Krupp Hoesch Plant were said not to constitute a health hazard to the

residents in the area. Both blood and soil tests were said to indicate that the dioxins in Dortmund "did not exceed the general background level."

"We really cannot yet say what the reasons were for such surprisingly high dioxin values," Viktor Braun, spokesman for Krupp-Hoesch Stahl AG, confessed. The measurements had only recently been concluded and the results were still being evaluated. Meanwhile the burning of coke in the Dortmund sintering plant has been optimized, and the use of chlorine-containing top gas dust discontinued. Through the use of these measures, the emission values were reduced to the "normal measure" of from 2 to 4 ng/m³ for such plants. Nonetheless, the enormous volume flow rates result in a troublesome yearly discharge volume.

Moreover, the measurements made in North Rhein-Westphalia led to a second, no less explosive, conclusion. The estimates of dioxin emissions, made in the former West Germany in the early 1990's, have to be substantially corrected upwards. As Peter Bruckmann, director of the emissions surveillance board in the Duesseldorf Environmental Ministry, explained: "It must be concluded that the prescribed acceptable yearly amount of 1 kg has obviously been exceeded since our State-operated program alone has ascertained more than 500 g." This year, Bruckmann and his team will undertake the examination of chemical plants. Bruckmann, however, does not expect to encounter any bad surprises. "Usually chemical processes proceed without oxygen, thereby preventing the formation of dioxins," he explained.

On the other hand, household ovens and stoves are one of the greatest sources of dioxin. This has been confirmed by recent investigations made in Switzerland. Up to 114 ng/m³ of dioxins have been detected in the exhausts from domestic heating fuels and the concomitant burning of household refuse.

While Schulz maintains that the current policy with regard to domestic heating fuels rests solely on appeals made to the good sense of the consumers, in the past other dioxin sources have been shut down or reduced by law. Thus, for example, the technical instructions with regard to the maintenance of pure air contain a general regulation on minimizing dioxin emissions. "In the case of organic substances, which are difficult to decompose but easily enriched and which are of high toxicity, the emission mass flow must, observing the principle of proportionality, be limited as far as possible."

Under the 1988 law regulating small heaters and stoves, wood, which has been treated with a protective agent or coated with a halogen-organic compound, cannot be burned. The emission limit value for dioxins and furans was set at 0.1 ng/m³ in the 17th ordinance of the 1990 German Federal Emissions Law. It is hoped that by the end of 1996 the dioxin discharge from such units will be reduced from the yearly 400 g recorded in 1988 to 4 g a year.

In addition, the Scavenger Ban of 1992, forbade the use of chlorine- or bromine-containing additives in gasoline containing lead. Furthermore, since 1989 the production of

pentachlorophenol and consumer products containing polychlorinated biphenyls has been forbidden.

However, the policy has not yet set any strict regulations in this regard for the steel industry. To be sure, in April 1993 a working group of the State Committee for Emissions Protection strongly advocated a target value of 0.1 ng/m³ for industrial plants as well. Klaus Toepfer, the German Minister for Environmental Affairs, and his State counterparts have so far not reacted. It is very clear, however, that the dioxin discharge from industrial plants has to be reduced. From the health point of view, the precautionary value for the daily dioxin intake, which the Federal Health Department has set at 0.1 picograms (trillionth of a gram) per kg of body weight, has, according to Federal Environmental Agency data, been exceeded by a factor of two in Germany.

The dioxin debate now revolves around the alternative target value or fixed limiting value as in the case of waste incineration plants. Claus Meyer-Wulf of the Kayser AG Metallurgical Works suspects that in future practice the permissible dioxin emission will be decided by testing individual cases. But Lower Saxony has already decided differently. In December 1993, a decree directed at the industrial and trade sector set a limiting value of 0.1 ng/m³. The industrial oversight offices were ordered to investigate suspect plants for their dioxin emissions. A spokesman in the Lower Saxony ministry said: "We are only requiring what is possible on the basis of the state of the technology and the minimization ordinance, in other words, what is technically and economically possible."

Since the unusually high values have become known, an intensive search has been underway in the Dortmund plant for the dioxin sources. Fine ore has been baked together with coke and lime in the sintering plant at about 1200° to a cake, then broken up again and smelted in the pig iron blast furnace. Sintering plants have the additional function as a recycler of residual and recirculating materials from rolling mills and steel-processing plants.

It is quite possible to reduce the dioxins in sintering plants. Guenter Ziegenbalk of Kloeckner Stahl GmbH in Bremen can demonstrate that in his iron ore sintering plant. In Bremen, they focus, first of all, on minimizing dust emissions by means of a double filter. As a desirable side effect, the dioxin discharge fell off by two-thirds to 2.2 ng/m³. This year the value will be pushed further down beneath the 1 ng/m³ mark through the use of hearth incinerator coke. Finally, the Bremen team hopes to undercut the limit value for waste incineration plants further by means of exhaust gas recirculation techniques.

Of course measures to protect the environment cost money. Investments in woven filters in the Kloeckner Steel Works in Bremen now run to DM16 million. The exhaust gas recirculation techniques will cost about the same amount. The Ministry for the Environment in Bonn is sharing the costs of these pilot plants.

Meyer-Wulf is also appealing to the politicians to examine the problem of dioxin reduction themselves. To date, Meyer-Wulf asserts, there are no ready-made, technically

perfected solutions. Each plant requires its own solution which, in turn, means that the costs are high. And, finally, it must be stated that high dioxin discharges from sintering plants are not a problem that is unique to North Rhein-Westphalia or Germany.

According to data provided by Dr. Uwe Lahl, senator for environmental protection in Bremen, about 40 sintering plants are now in operation in West Europe, of which only 14 are in Germany. Lahl notes further that very little is known about the plants in other European countries, some of which are much older than those in Germany.

New Pollution Controls To Take Effect in EU in 1996

94wn0254d Duesseldorf VDI NACHRICHTEN
in German No 13, 1 Apr 94 p 4

[Text]VDI-N, Duesseldorf, cf—Cars are to become cleaner. Last Tuesday the Council of the European Union passed the new guidelines on lowering the permissible exhaust gas levels for motor vehicles. The permissible emissions will be lowered in three stages. In the first stage the catalytic convertor became compulsory for new cars throughout Europe last year. The second stage will come into force in 1996. For new cars it will reduce the emission of hydrocarbons and nitric oxides by an additional 56 percent (gas engines) or 38 percent (diesel engines), of carbon monoxide by 39 percent and 68 percent respectively, of particles by 56 percent. For the third stage, starting from the year 2000, the EU commission wants to suggest maximum values by the end of the year. "The automobile industry will received criteria for their development plans in plenty of time," commented Federal secretary of the environment Klaus Toepfer.

The European Parliament had demanded stricter limiting values and had also suggested interposing another stage starting in 1998. The members of parliament spoke particularly strongly about there being separate limiting values for hydrocarbons and nitric oxides. But when it came to a vote there was not a majority in support of the proposals for change.

Waste from Dual System To Be Used as Raw Materials

94wn0254e Duesseldorf VDI NACHRICHTEN
in German No 13, 1 Apr 94 p 2

[Article by Juergen Siebenlist: "DSD Waste Becomes Chemical Raw Material Source"]

[Text]VDI-N, Cologne—The decision about utilizing used plastic packaging from the "Yellow Sack" of Dual System Germany (DSD) in Cologne for raw materials has been made. On 16 March the board of directors of the DKR Company for Plastics Recycling in Cologne authorized management to negotiate contracts with the companies BASF/Otto, RWE and VEW/KAB for the construction and running of recycling plants with an annual capacity of up to 500,000 tons.

The head of the BASF plastics division, member of the board Dr. Albrecht Eckell, considered this decision to be an "approved surcharge" for his company's raw material recycling plan. For a consortium made up of BASF AG in Ludwigshafen and Otto Plastics Service GmbH in Heidelberg has made DKR an offer to utilize the materials of 300,000 tons of used polymers annually starting in 1996.

At the moment BASF is constructing a suitable pilot plant in Ludwigshafen to transform mixed and soiled plastic waste into reusable petrochemical raw materials. The resulting distillates are naphtha, olefins and aromatics, which are used as on-site materials within the investment group. According to Eckell, loss of quality does not occur as it does in the case of working material recycling (plastic wastes are made into plastics again).

The BASF board member sees raw material recycling as an ecologically and economically sensible alternative for utilization. For he says that "disproportionately many resources" are used in the recycling of working materials for packaging marked with the Green Dot. "Collecting, sorting and cleaning require an unreasonably high level of energy, water and costs," says Dr. Albrecht Eckell, "which cannot be justified ecologically or economically."

These problems are also reflected in the new licensing compensation structure for the "Green Dot," which was agreed on by the DSD board of directors on 21 March. It stipulates, for example, that from 1 October an additional DM2.95 per kg is to be paid to Dual System for plastic containers over a base amount defined by number and volume.

This means that the timing would be precisely right for raw material recycling as a brake on costs. For according to Dr. Albrecht Eckell the reduction of the total utilization costs for plastics is a particular concern of the plastics industry. Of the present high costs of about DM3,000 per ton for recycling in Dual System, about 80 percent can be traced to expensive collecting and sorting, he said. But with raw material recycling that could largely be dispensed with. Achievable exploitation of the material is given by the BASF plastics expert as 85 to 95 percent. Says Eckell: "This makes raw material recycling—contrary to a common prejudice—an efficient kind of utilization."

In addition, the goals of the packaging ordinance, which are ambitious in the opinion of BASF—according to current interpretation, from 1 July 1995 approximately 600,000 tons of private commercial packaging must be collected, sorted and materially reused by DSD—can only be met, according to Dr. Albrecht Eckell, with the help of raw material recycling. In this way 300,000 tons of DSD material could be recycled annually from mid-1996.

For plastics recycling on a major technological scale BASF needs an additional surcharge of about DM350 per ton and, according to Eckell, "stable framework conditions." Among these he includes permanent exemption from the requirement for plastic packaging to be returnable in the marketplace.

Wolfram Brueck is confident that the DKR's decision marks a great step forward in this regard also. "There is no more reason to set a time limit on exemption for plastics through the Land departments," says the DSD managing director.

But more than one plant is needed for comprehensive utilization of the used plastic packaging created in Germany. In the view of BASF board member Eckell, only through the construction of additional utilization facilities by other companies can the goal of keeping dumps free of plastics be reached. As an example he cited Veba Oel AG, which hopes to transform 120,000 tons of used plastics annually into a synthetic oil in the coal/oil plant in Bottrop starting in 1996. He also listed RWE's plan to use 70,000 tons of used plastics annually in the production of synthesis gas.

New Procedures Developed for Recycling Plastics

94WN0254A Duesseldorf VDI NACHRICHTEN
in German No 13, 1 Apr 94 p 25

[Article by Gerd Trommer: "A Second Life for Old Plastics: VDI-North Baden Palatine Learns About Plastics Recycling"]

[Text][First para is editor's summary] VDI-N. Mannheim—Members of the district association for North Baden-Palatinate viewed the new plastics reprocessing center of the BASF in Ludwigshafen. Here methods for reprocessing plastic wastes are tested.

That plastic is neither a totally artificial nor a completely new material was discovered by the visitors from North Baden and the Palatinate at BASF. For example, the resin with which Pharaoh Rameses, 1301-1234 B.C., was mummified corresponds chemically to a modern plastic. By now plastics have become the number one material in the world. Every year about 100 million tons are used.

This amount also accounts for the necessity for environmentally friendly reuse or disposal. The plan of the German plastics industry anticipates putting emphasis on waste avoidance, material recycling (for the working materials) and chemical reuse (for the raw materials). Thus dumping and burning are "out" as direct methods of disposal. Working material recycling means the direct refashioning of used plastics into new products. In the opinion of plastics producers, it represents the correct solution, if raw materials, energy and costs can be saved in that way.

In contrast, raw material recycling means the reseparation of plastic materials into chemical or petrochemical raw materials. The chemical industry regards it as the correct procedure, especially for the reuse of used plastic packaging. Processes in use at the moment include pyrolysis, hydrogenation and chemical separation.

Investments in the plant technology alone for the new plastics reprocessing center of the BASF add up to DM3 million. The process technologists want to develop "recipes" for working material recycling of plastics. Already 15 to 20 percent of used plastics would be able to earn a second

life in Germany by this means alone, as long as the materials in question are remeltable thermoplasts. Indeed, these represent about 80 percent of the world's plastics.

In contrast to the melting down of metals, impurities or admixtures represent a significant hurdle for plastics. For instance, if all organic impurities are incinerated during metal melting processes, that is not to be expected at temperatures between 100 and 300°C for plastics. Thus a prerequisite for the reprocessing of working materials is clean, perfectly sorted, extrudable plastic wastes with no noxious materials. The engineers of VDI saw on the spot how they are produced at the technical school. Three plant blocks with a total of 20 stations are available. Saws, chopping blades, mills or special grinders of various kinds transform the plastic parts into granules. Separation of metal parts, filtering of waste air and sound protection take place in parallel. Either dry separation or wet reprocessing follows. Next come sifting arrangements, magnetic separators, gravity and air separation procedures or alternative or additional washing processes, sorting in a water bath using flotation or sinking, and finally drying processes.

A particular value is placed on environmentally friendly disposal of all the remnants and toxins which come along with the plastic parts, e.g. oils, brake fluids and other impurities. At the moment the plant accepts throughput of 50 to 500 kg per hour in single-shift operation. The individual stations can be linked by process control and material transport arrangements.

Work and experience in the technical school are also intended to give information about which cycles and combinations can assure disposal on a scale suitable for major industries using economic and ecological criteria. "Chemistry is doing its homework now; and the cycles will soon be closed," says Prof. Anton Weber of the BASF, viewing the future with optimism. After viewing the new technical school, the chairman of the VDI, Dr. Heinz Mueller, noted with pleasure that the prevailing opinion within the chemical industry had changed: "If a year ago thermal reprocessing was as it were the only possibility, we welcome the fact that the chemical industry now values recycling with its alternatives for working materials and raw materials!"

Groundwater, Drinking Water Threatened by Pollutants

94WN0254C Duesseldorf VDI NACHRICHTEN
in German No 13, 1 Apr 94 p 20

[Text] VDI-N, Duesseldorf—The quality of the groundwater is threatened to an alarming degree by toxins. Measures such as water protection areas are no longer adequate for protection against oil, halogen compounds, nitrates and pesticides. Numerous sources of toxins are unknown. This is the conclusion of the Bureau for Evaluation of Technology Effects (TAB) in the German Bundestag in the recently published report "Groundwater Protection and Water Maintenance."

About 70 percent of the drinking water in Germany is obtained from groundwater. In the last two decades it has

become clear that the buffering and filtering capacity of the soil is no longer adequate to block out the multitude of toxins. The purifying powers of the groundwater itself are small; impurities, once introduced, are difficult or impossible to eliminate.

Protection of the groundwater through the designation of water protection areas is welcomed by the TAB in principle, but the bureau points out that according to statements by the Federal government about 50 percent of the necessary water protection areas have been planned, but not yet designated. In addition, so many toxins are introduced through the air that many groundwater protection areas had to be given up.

It is true that industry, agriculture and transportation are known as general sources of toxins, but it is rarely possible to assign a substance to its specific cause. For example, the construction industry is a sector with many unknowns: according to the TAB report more and more chemicals are being used whose effect on the environment has been investigated only very inadequately.

The TAB demands instead that the water be protected from toxins over its whole cycle. "Groundwater-endangering products and production processes should be more expensive," is one recommendation. In order to reduce the introduction of nitrogen, the experts recommend a price increase for fertilizers through a nitrogen tax which is to be paid by the manufacturers or importers of fertilizer.

The TAB has investigated the building industry more closely as a source of toxins. Construction sites could have a "toxin mortgage" imposed on them, which is used to cover the costs of cleanup during demolition. This would mean that the building contractor would already have an incentive to use building materials which are reusable and low in toxins. In addition, the TAB believes that it would be thinkable to introduce a use tax for chemical components, since in most cases the producers of the components are responsible for the creation of toxic wastes.

High Yield of Recycling Oil Obtained from Plastic Waste

94WS0326A Duesseldorf VDI NACHRICHTEN
in German No 16, 22 Apr 94 p 24

Environmental Minister Toepfer Opens First German Plastics Hydrogenation Facility in Bottrop

[TEXT] Bottrop—With a symbolic push of the button, on April 12th in Bottrop the Minister for the Environment Prof. Dr. Klaus Toepfer set in operation the first commercial installation for recycling plastic packaging as raw material. For Dr. Eberhard von Perfall, as CEO of Ruhrkohle Umwelt GmbH in Essen, this was the realization of a "dream of true recycling": 32,000 metric tons of synthetic oil will now be produced from 40,000 metric tons of mixed plastic waste annually.

Two years ago Wolfram Brueck was happy that the operators of the Bottrop coal-oil facility (KAB) were able to show him a way out of the terrible dilemma of waste

disposal of mixed plastic waste. This was because the Managing Director of Dual Systems Deutschland (DSD) in Cologne did not find in the plastics industry nearly the recycling capacity urgently needed for long-term compliance with the recycling quotas set by the legislature. With the start of using plastic as raw material in Bottrop, he can now believe in a change. Since the beginning of the year, the KAB has been changing polymer packaging waste back into syncrude [synthetic crude oil]—a recycling product which is scarcely distinguishable from light mineral oil and can be used again without loss in quality as a high-grade oil refinery product.

Eight hundred kg of oil are produced from one metric ton of mixed plastic, according to the estimate of the current facility's level of efficiency in processing material made by Dr. Eberhard von Perfall to the guests at the official start of operations on April 12th. At the same time, the CEO of Ruhrkohle Umwelt GmbH in Essen, which operates the facility together with Veba Oil AG, Gelsenkirchen, stressed the great gain in energy. He claims that only about 10% of the energy content (in terms of the energy which would be released if the plastic waste were incinerated) is lost through hydrogenation.

"We are not in essence entering new territory here," said Dr. Hubert Heneka referring to the already tested technique. According to the President and CEO of Veba Oil AG, a technique which has been refined over decades is being used to solve a current waste problem: the reconversion of used packing plastic back into the original oil components. Using the modified Bergius Pier process, from 1981 to 1987 the KAB already converted around 250,000 metric tons of hard coal into liquid products. After coal hydrogenation could no longer be continued for economic reasons, the operators modified the facility for hydrogenation of petroleum residue using the Veba-Combi-Cracking process (VCC). In 1991 authorization for processing used waste oil, used solvents, and varnish or paint sludge was broadened to include the recycling of materials containing PCP.

In April of 1992 the recycling of plastic waste was at last at hand. The insensitivity of the VCC process toward the content of the material involved was the technical prerequisite [for this to work], the pressure for recycling coming from the government's packing guidelines was the economic prerequisite. A major trial which was carried out at that time in which for the first time 60 metric tons of plastic waste was hydrogenated together with heavy petroleum residue confirmed the basic suitability of the process. But according to Heneka, it also made it clear that procedural steps developed for coal hydrogenation were too expensive for industrial recycling of plastic waste. Therefore an primary system had to be conceptualized and made, by means of which the polymers supplied as granular material are transferred as a fluid permitting them to be pumped together with the petroleum residue into the hydrogenation section. Heneka: "It is only this newly developed step in the process, the depolymerization, which now satisfies the requirement of recycling five metric tons per hour on a continuous basis."

After 12 months under construction, the expanded facility with a total annual capacity of around 200,000 metric tons was ready for operation to recycle 40,000 metric tons of waste plastic per year. Operators had invested around 20 million German marks in modifications of the KAB, particularly in the core of the plastic preparation process, the depolymerization reactor.

Here, completely cut off from the external world, the large plastic molecules are thermally split at temperatures of 350 to 400°C, so that they can be pumped without problem along with vacuum residue, additives and hydrogen into the actual hydrogenation system.

In the hydrogenation reactor, syncrude (synthetic crude oil), hydrocarbon gas and hydrogenated bitumen are produced at a processing pressure of 300 bar and [a temperature of] 470°C. The hydrochloric acid released from the PVC during depolymerization is reclaimed as liquid hydrochloric acid in an auxiliary system and handed over marketing.

A pipeline directly links the KAB with the nearby [oil refinery of] Ruhroel-Raffinerie in Scholven. In conjunction with the Kokerei Prosper [coke-oven plant], the delivery of the product as well as the service of the facility is thus efficiently assured.

Still, the KAB operators have not yet passed the break-even point in plastic waste recycling. With an annual throughput of 40,000 metric tons of plastic waste, the syncrude produced in the Bottrop hydrogenation plant is about three to four times as expensive as comparable crude oil on the Rotterdam market. Dr. Hubert Heneka: "We currently need a turnover of around 800 GM [German marks] per metric ton. But we want to take the offensive in this business and ensure for ourselves a large share of the market in plastic waste recycling." The speaker from Veba Oil hopes to be able to cut costs in half if the legal requirements for expanding the capacity can be managed quickly with the city of Bottrop. Presuming that a rapid agreement can be reached, an annual capacity of 120,000 metric tons for recycling of plastic as a raw material would already be available in 1995.

But Kurt Schmitz, the mayor of the urban district of Bottrop, "has trouble imagining" at this time an expansion of the facility. Substantial problems with acceptance already had to be overcome when the KAB first began [working with] the disposal of problem waste.

Through the contributions made by DSD in recycling, the process today is, however, already paying off for the operators: according to the words of its managing director Wolfram Brueck, Dual System Deutschland currently pays 757 German marks per metric ton of plastic delivered for recycling in Bottrop. The common goal is to make it economically competitive with incineration.

Environmental Minister Toepfer, who put the incineration costs at around 500 marks per metric ton at this time in Germany, was convinced at the official start-up of recycling plastic as raw material in Bottrop: "The horrific

numbers of the high utilization costs are gradually becoming a thing of the past."

Toxic Waste Found in Elbe River Sediment

94WS0326B Duesseldorf VDI NACHRICHTEN
in German No 16, 22 Apr 94 p 27

Tests Find Heavy Metal Content

[TEXT]Duesseldorf. The Elbe is supposed to be made clean again. According to new tests, the river has actually been spared much pollution since the [political changes in 1989], but over the years high levels of heavy metals and organic contaminants have collected in the sediment of the Elbe and its tributaries.

At 1,165 km in length and up to nine km in width [in some places] with a average current of 710 m³ of water per second, the Elbe is one of the largest rivers in Europe. But at the same time, it is also one of the dirtiest: the Elbe is highly polluted and in some stretches ecologically destroyed. Around 7.6 million people in the nine German states either permanently or for long periods of time receive drinking water which does not meet the requirements of the European Union (EU) and the drinking water regulations.

Germany, the Czech Republic and the EU under the roof of the International Commission for the Protection of the Elbe (IKSE) already joined together years ago to save the Elbe. By 1995 pollution of the Elbe and her tributaries is supposed to be substantially reduced, and a clear improvement in the water quality up to grade II ("moderately polluted") is supposed to have been reached.

Moreover, the Ministry of Research and Technology has also taken on the Elbe and her tributaries with its "Elbe 2000" project. The goal: to win back stretches of the river as renaturalized river meadows left to nature. By the year 2000 the pollution of the Elbe should have been reduced to such an extent that, according to the BMFT, "the basis [will have been created] for a water system which can be used in an ecologically balanced, sensible manner in harmony with nature." The BMFT has made 61 million German marks available, and all investigations by the "Elbe Research" working group of the International Commission for the Protection of the Elbe (IKSE) are being coordinated.

The numerous factory shut-downs after the political upheaval have done the Elbe good. She carried less ammonium and mercury in 1993 than in 1985, but more chlorinated hydrocarbons. According to tests by the Elbe's water quality station in Schnackenberg, the amount of ammonium sank from 54,000 metric tons in 1985 to 7,700 metric tons in 1992 and to 6,900 metric tons in 1993. The amount of mercury dropped from 28 metric tons in 1985 to 4.2 in 1992 and 1.9 in 1993.

In contrast, pollution of the Elbe from chlorinated hydrocarbons climbed in 1993 to 1985 levels. Last year the concentrations of beta-hexachlorocyclohexane, a waste product in the production of the insecticide Lindane, were at 110 kg far higher than the 1985 level of 85 kg. According

to Hamburg's senator for the environment Fritz Vahrenholt, it is suspected that the pollution can be traced back to illegal dumping.

In the meantime the first results of the joint "Elbe Tributaries" project are available. They show "that a persistent improvement in the Elbe's water quality is only possible if at least the large main tributaries are included in the clean-up measures," since it is through them that much of the pollution gets into the river, especially the heavy metals.

Scientists are particularly directing their attention to the heavy metal contamination of the sediment, since this can be determined not only at certain points but can also be followed along downstream. Sediment provides a "long-term memory" which mirrors for a longer period of time the accumulation of suspended materials.

The fine grain fraction with a granulation of up to 0.02 mm is being studied, because it corresponds to the suspended material transported in water which, because of its grain fineness, has a high bonding capability with heavy metals and numerous organic pollutants, and [thus] accumulates them. The natural (geologic) heavy metal concentration is used as a reference base: values at the level of this geologic concentration correspond to class zero ("unpolluted"), and each doubling of the values means a move to a new classification.

The analyses show that the sediment in the basin near Leipzig is "heavily polluted" (class four) with cadmium. The scientists also found arsenic and lead in high concentrations: in Muenzbach near Freiberg sediment was sampled which contained a class seven (extremely polluted) level of arsenic concentration. The researchers trace this back to the steel and iron industry there, which is also responsible for the high levels of lead. Nickel was found in the sediment beneath the Aue nickel plant at levels up to class five ("heavily to excessively polluted").

At the lower reaches of the Joint Basin east of Bitterfeld lies the man-made Muldenstein lake which at the beginning of the sixties was laid out in a former brown coal opencast mining area. As it turned out, the [lake] forms a sediment trap, as the sediment brought in from the basin had accumulated here in a layer averaging about 30 cm high. In all, the researchers calculated that about 25,000 metric tons per year accumulate in the sediment of the artificial lake, or about 400,000 metric tons since its flooding. It contains about 1,030 metric tons of zinc, 114 metric tons of lead, 101 metric tons arsenic, 98 metric tons copper, 71 metric tons chromium, 43 metric tons nickel, 32 metric tons cadmium and about 1 metric ton of mercury. The uranium level is estimated to be 50 to 70 metric tons. Accumulation in the basin constitutes a serious potential danger, since if it is stirred up again and comes in contact with oxygen, the highly toxic cadmium in particular can become mobilized and pass into the food chain or the ground water.

Keeping the public's drinking water safe is, according to the BMFT, an urgent goal, since the nine German states, which in great part constitute areas of water shortage, will

even in the future not be able to dispense with obtaining drinking water from the bank filtrate of the Elbe. Therefore, four pilot or demonstration facilities for obtaining drinking water from bank filtrate or from the ground water in the Elbe's drainage area have been being funded since 1990. It is also being studied here whether using activated carbon filters can make it easier to obtain drinking water from heavily polluted bank filtrate.

Photo Caption

l. p 27: Measurement takers obtaining water and sediment samples are now a common sight along the Elbe and her tributaries. It is still a long way off before the pollution of the rivers is reduced to acceptable levels.

Swiss Develop Scrubbing Process for Flue Gas

94WS0326C Duesseldorf VDI NACHRICHTEN
in German No 16, 22 Apr 94 p 27

Liquid Absorption Lowers Emissions from Industrial and Waste Incinerators

[TEXT]Duesseldorf. *How cleanly an industrial or waste incinerator plant operates depends first and foremost on the scrubbing of the flue gas. A process tested in Switzerland offers an economical and effective alternative.*

Requirements regarding the effectiveness of clean-ups have increased a great deal since the eighties, the last significant milestone up to now is the 17th Regulation in the Federal Emission Protection Law, which since 1990 has drastically lowered the permissible levels for heavy metals, dioxins and furans in new waste incinerator plants. Because of their size and cost, modern facilities for cleaning waste gas are scarcely distinguishable from the actual production or incineration units.

A process for liquid absorption tested in Switzerland meets legal standards for separation efficiency and also promises substantial advantages with respect to investment and operating costs. The principle is simple: an alkaline washing solution is sprayed at high speed into the reaction compartment (absorber) and turned by the turbulence into tiny droplets which form a high surface area for reactions with the materials contained in the flue gas. The mostly acidic components of the flue gas are neutralized, the used washing solution is captured. A partial stream from this is replaced with calcium hydroxide or calcium chloride, the resulting calcium salts are filtered off and dried, the regenerated washing solution can then be sprayed back into the absorber again.

The fundamental difference compared to conventional flue gas scrubbing procedures is: the liquid absorption does not work on the countercurrent principle, but instead the opposing stream of gas and liquid is maintained, the gas scrubbing does however occur in an horizontally placed washer. This technique permits a connection in series of several absorption stages and thus a reduction of the respective concentrations of pollutant in the waste gas [at each stage].

"In principle it is suitable for nearly all combustion processes," according to the inventor and patent holder Johann Renneberg, director of Renneberg Engineering Consulting in Neckargmuend. It is, however, especially suited for use with waste gases which are heavily contaminated with sulphur and chlorine. Test runs in the special waste incineration plant in the Swiss [town of] Hausen near Brugg had already yielded astonishing conclusions by the end of the seventies. According to measurements taken by the Federal Materials Testing and Experimental Institute (EMPT) it was possible to separate 99.9% of the sulphur dioxide (SO_2), 99.9% of the hydrogen chloride (HCl) and 99.9% of the hydrogen fluoride (HF). The results in a incineration plant built in Stuttgart were also convincing. According to Renneberg it was possible to reduce the HCl concentration from around 30 g per m^3 to 7 to 11 mg/m^3 .

The alkaline components of the washing solution also react with the nitrogen oxides (NO_x), carbon monoxide (CO), and even carbon dioxide (CO_2). NO_x is converted to 92%, CO to 50% and CO_2 to 15%. But Renneberg was also concerned about the separation of dioxins and furans. According to his thinking, the washing solution could be sprayed in together with suspended activated charcoal, which picks up dioxins and furans.

Since a separate NO_x reduction step and a downstream activated charcoal filter can be dispensed with, liquid absorption saves money. According to Renneberg, the investment and operating costs can also be kept low through the simple construction of the absorber, the small space requirement and the recovery of the washing solution. Compared to conventional flue gas scrubbing methods, he figures on investment costs which are 20% to 30% lower, operating costs 15% to 25% lower.

There is, however, a tinge of bitterness: since the development of the process at the end of the seventies, none of the financially strong installation builders has shown any interest in a co-production. At the beginning of the eighties, the interest in more effective processes for flue gas scrubbing was weak, since at that time the Standards for Technical Instructions for Air [Treatment] did not yet exist. And today? "The market in Germany is firmly in the hands of a few large companies," Renneberg summarizes his experience: "new and cost-efficient development has hardly any chance."

He is now turning his hopes toward the USA. The Epru Institute in San Francisco is now carrying out an analysis—commissioned by the government—of current techniques for cleaning waste gas. Renneberg will introduce his process there. "Then perhaps it will make its way back to Germany again."

Environmental Consciousness, Cost Aversion Found in Poll

94WS0326D Duesseldorf VDI NACHRICHTEN
in German No 16, 22 Apr 94 p 27

[TEXT]The environment and ecology are in spite of the economic crisis firmly lodged in the consciousness of

broad sections of the German public. On an ecology consciousness scale of one to ten, Germans had the high score at 7.8. Eighty percent of Germans claim that they contribute to environmental protection through their own behavior and that they are willing to buy environmentally friendly products. But only half of them are willing to spend more money to do so. In fact, 80% reject higher gas prices, according to a poll taken by the research institute of Axel Billig & Partner in Cologne and commissioned by the Berlin Office of the Environment.

The ecologically aware person has become a statistical norm. Environmental consciousness is no longer dependent on age, sex or education. Yet in spite of the pronounced ecological awareness of the Germans, individual behavior meets its limitations when it comes to [imposing] personal restrictions. Thus, over half of the respondents were ready to dispose of batteries separately or to buy energy saving appliances, but every second person rejected higher prices for environmentally friendly products. Fewer than 20% would limit their driving and only 12% would keep the light lower. For 15% the "pain threshold" for modifying driving behavior was a gas [price of] two German marks per liter.

Only one finding that the government and business are doing everything necessary for the environment—60% by contrast—op of the opinion that either nothing or practically nothing desirable is being done. Yet almost 60% say that not only would the government and business do substantially more, every individual could also contribute more as well. Appeals alone are not enough to increase willingness on the part of individuals, according to the Ministry for the Environment. Instead, environmentally appropriate behavior must be made easier and, if possible, less expensive. For example, offering environmentally friendly products at prices which are less expensive than the others and not, as is often the case, more expensive.

Supercritical Water Used To Break Down Solvents, Toxins

94B N02804 Duesseldorf VDI NACHRICHTEN
in German No. 18, 6 May 94 p 18

[Article by] Ursula Schiele-Trauth: "Fluids Replace Dangerous Organic Solvents and Break Down Harmful Substances."

Ursula Schiele-Trauth, 6 May 94 - Nature possesses substances that occur in almost unlimited amounts. These natural materials are capable of assuming quite different properties. In the "supercritical" state, for example, they can act as solvents that are harmful to the environment and break down extremely stubborn ecological pollutants. Commonly stable harmful substances can be broken down into CO_2 and water.

When fluids or gases are heated beyond their respective "critical temperature" and "critical pressure," they undergo a surprising metamorphosis. They lose their typical properties and take on entirely different ones. The extraordinary solvent power they possess in this supercritical state is of great interest for the technology field.

Dr. Helmut Schmieder of the Institute for Hot Chemistry at the Nuclear Research Center (KFZ) in Karlsruhe explained: "Water becomes a universal solvent for organic compounds under such conditions." With respect to their densities, the supercritical media scientists designate as "fluids," are similar to liquids, although their molecules move as rapidly as gas particles. Fluids, therefore, surpass all other liquids or gases in the rate of their solvent processes.

The best known such process introduced throughout the world is the removal of caffeine by means of supercritical carbon dioxide. Professor Helmut Tilscher at Munich's Technical University observes that "problematical solvents like methylene dichloride, benzene, and toluene, which had been used previously, can now be replaced." Carbon dioxide enjoys the greatest advantage as a supercritical extracting agent by virtue of the fact that it already achieves the solvent properties of a fluid at a temperature of 31°C and a pressure of 74 bar.

In recent years, these environment-friendly and time-saving extractions have undergone rapid development in the United States, especially in the food industry, where to a great extent the use of halogenated hydrocarbons is forbidden. In this way, the fat content of foods sold as dietary aids is reduced. These processes are used to remove up to 80% of the cholesterol from powdered eggs and to derive aromatic substances from herbs. The pharmaceutical industry is currently testing a supercritical carbon dioxide extraction process to purify vitamin E. The process could replace vacuum distillation, which has been required to date, but which, with its temperature of 200°C, entails the danger of thermal decomposition. Carbon dioxide is nontoxic as a solvent, and it can be easily separated again from the dissolved substances after the reaction by means of "relaxation."

These supercritical processes are being increasingly used to separate organic toxins or oils out of sewage and contaminated solids. In laboratory tests researchers in the Nuclear Research Center have now succeeded in almost completely separating the grinding oil from the sludges, which build up during glass processing, from the rubbed-off glass powder. "In so doing," Schmieder concludes, "nothing more prevents the grinding oil from being reused." Previously, almost DM1,000 per ton had to be spent to dispose of the sludges in dumps. Similar experiments are also underway in Karlsruhe to recover the same oils from metal grinding sludges. About 150,000 tons of such sludges accumulate yearly in Germany.

Reactions in supercritical water offer a new alternative for the destruction of highly toxic waste materials. Water only reaches the fluid state at a temperature of at least 374°C and a pressure of 221 bar. It not only becomes a good solvent for organic harmful substances, but is also mixes thoroughly with the air or oxygen. Under these conditions the substances dissolved in the water oxidize, and are therefore destroyed, in seconds. Several laboratories in Germany and the United States are now studying "supercritical oxidation" as a means of disposing of harmful substances.

The Karlsruhe Nuclear Research Center has developed a pilot plant operation at 500°C and a pressure of 250 bar with an hourly through-put of 10% watery media. The content of harmful substances must not exceed 10%. The system requires very little space. The 15-m-long Karlsruhe tube reactor only has an inner diameter of 9 mm. With the words, "unlike incineration, these reactions take place in a closed container," Schmieder describes a considerable advantage of the process, namely, in that no harmful substances can escape.

While in the subcritical state in wet oxidation the harmful substances are only partially decomposed, in the supercritical process up to 98% of stubborn waste materials like polychlorinated biphenyls (PCB), explosive materials, and chemical agents decompose. The organic skeleton is completely oxidized into carbon dioxide and water. No nitrogen oxides are formed since the organically bound nitrogen is transformed mostly into molecular nitrogen. Sulfur, phosphorus, and halogens occur as acids or salts.

These anorganic salts are not soluble in the supercritical water. They settle on the vascular walls and still constitute processing difficulties. "The greatest problem is the massive corrosion attack which even nickel-based alloys find difficult to resist," Professor Siegfried Leistikow, materials expert at the Karlsruhe Nuclear Research Center, elaborated. The supercritical media are extremely aggressive, although hope exists for a solution through the use of linings made of noble metals.

But, in so doing, the system becomes more expensive. "However, the costs even out since the reactors are so small," Tiltcher reckons. Tiltcher sees the best chance for the process in special applications like byproducts from the production of medicines, chemicals from the varnish and paint industry, pesticides.

The efforts of the various laboratories and pilot operations in the Fraunhofer Institute for Chemical Technology (ICT) in Pfaffenhofen are concentrated on the decomposition of halogenated hydrocarbons, nitro- and amino aromatics like plastics. Professor Michael Modell of Framingham, Massachusetts, believes that sewage sludges are an ideal object for supercritical water oxidation. Having a solid material component of under 10%, they are just right for this process. Modell is professor emeritus at the Massachusetts Institute of Technology, at which the bases for the elimination of harmful substances in supercritical water were developed. He claims that in laboratory conditions he can prevent the caking of salts and therefore prevent corrosion by undertaking certain constructive measures. The first commercial plants are scheduled for this year.

The attempt to clean heavily contaminated soil by means of supercritical water is being tackled by Professor Gustav Brunner in Hamburg-Harburg. The soil is placed in the system as a fixed bed and then irrigated by the fluid. "The supercritical water has to handle a dual role in the process," Brunner explains. First, it has to rid the soil of as many hydrocarbons as possible, and, second, it has to oxidize the contaminants only to the point that they become biologically degradable. However, Brunner admits

that the costs involved in this process of soil cleansing are so great that it can only be used in exceptional cases.

Heavy Metals Extracted from Soil by Electrokinetics

94WN0280C Duesseldorf VDI NACHRICHTEN
in German No 18, 6 May 94 p 27

["Berlin Scientists Develop Electrochemical Soil Rehabilitation Process"]

[Text] VDI-N, Duesseldorf, 6 May 94 - To date, fine-grain soils, port-, clear-, or galvanic muds could only be inadequately cleansed of heavy metals and harmful organic substances at great cost. The Institute for Technology and Environmental Protection of the EGA (Development Company Adlersdorf mbH) in Berlin is currently testing an alternative method, which was recently displayed at the Hannover Fair. In the new method, the heavy metals and harmful organic substances are removed from the soils and muds electrokinetically.

In the process, an electrical field, which induces a fine water flow in the soil capillaries, is generated by means of two electrodes. Since the harmful substances dissolved in the ground water are encased in a water envelope (hydrate shell), they are—owing to the viscosity of the water filaments—moved along with the flow until they reach, depending on their electrical charge, either the cathode of the anode. Heavy metals like lead, cadmium, and mercury, but also the harmful organic substances as well, together with their water envelopes gather at the poles, where they are then pumped off. The EGA researchers see particular advantages in the new process in that it can be used to cleanse the ground soils beneath developed areas as well.

Researchers at the Laboratory for Chemical Engineering in Geneva (EIG) are developing a similar technique. There, the mercury-containing sewage is caused to flow through an electrochemical cell, where the positively charged mercury ions gather at the cathode. The mercury is subsequently removed from the cathode by heating in an evaporator with an internal condenser, where the metal is recovered. The cathode can be used repeatedly. Using this method, even small businesses can process mercury-containing sewage economically and at little cost to the point where the mercury residual concentration is five ppb.

Passive Cogeneration from Water, Sand for Refrigeration

94WN0280B Duesseldorf VDI NACHRICHTEN
in German No 18, 6 May 94 p 27

[Article by Christa Friedl: "Zeolite Cools and Heats Economically and in an Environment-Friendly Manner"]

[Text] VDI-N, Duesseldorf, 6 May 94 - Whenever cooling is generated, waste heat occurs. A new process, developed by the Zeo-Tech Company in Bavaria, utilizes the waste heat to generate hot water simultaneously with the cold in the refrigerator. All of this is accomplished without the use of

environment-threatening CFC's (chlorofluorocarbons), FHC's (fluorinated hydrocarbons, or hydrocarbons).

The Joern Schwarz stand at the Hannover Fair simply displayed cold beer and hot water. At first glance, that in itself constituted nothing particularly unusual at this year's Fair. What is extremely unusual, however, is the way the main developer at the Zeo-Tech Company in Unterschleißheim, Bavaria, cools the beer and heats the water. Both are effected with water vapor and 12 kg of sand.

Schwarz relies on a simple technical principle, namely, that highly porous materials—in this case, a sand-like zeolite that occurs naturally and which for a long time has also been used as a substitute for phosphates in detergents—at a negative pressure voraciously sucks up the water evaporating from a water surface. In the process, the minerals develop heat, while the water, owing to the evaporation, is cooled and eventually frozen. Some zeolites can—without replacement—sop up water as often as needed and then release it again. In this process, a cold circulation is generated.

"Private households use 25% of the primary energy expended in Germany annually to produce heat and cold," Schwarz points out. Usually, this is done in separate processes as a result of which a considerable amount of power is lost. What could be more desirable than to have the cold and the heat generation linked together?

The successful result of this endeavor is the "cool-boiler," a combined apparatus consisting of an electrical hot water generator and a refrigerator. The bottom line here is that only the boiler consumes power. "The operation of the refrigerator comes gratis," Schwarz is pleased to say.

It was not a simple matter to convert the theoretical physical principles into a practical system however. It cost the researchers at the Zeo-Tech Company about three years in R&D time before they could build the first successful prototype. This method of discontinuous energy conversion proceeds in two phases. The first phase lasts only as long as it takes for the zeolite to become saturated with water. Then, in the second phase, a reverse procedure is effected through the introduction of heat. The water is forced out of the zeolite in the form of water vapor, is then liquified in a condensor, and then, in the next step, can via a collecting main be sucked up again in the evaporator.

For the operation of the cool-boiler, the two evacuated zeolite containers (weight filled of each is six kg) are alternately heated, thereby forcing the adsorbed water out (desorber). For the prototype, the required electrical power was about 1 KW. The water vapor releases its heat in the condensor, after which it is transferred to the boiler water through the casing wall. The water flows through a line into the refrigerator's evaporator. There, the other zeolite container can suck up the water vapor that is generated. In this way, the heat required for the evaporation process is drawn out of the inside of the refrigerator. During the process, the zeolite is heated to 150°C, sending this heat to the boiler water via a heat-exchanger. The process continues until one adsorber is saturated with water and the other has its water removed. "Using twelve kilos of zeolite, the process

lasts two to three days," Schwarz notes. Then the adsorber and desorber exchange roles. This technique can generate up to -20°C in the refrigerator, and 90°C in the boiler. The system is regulated by an ESP control system. When the temperature gets too high, a temperature sensor in the refrigerator sends a pulse signal to the vacuum pump which again activates the adsorption process.

One of the hard nuts to crack in the development of this technique was the evaporator. Decisive in its functioning is a fiber in which the water can rise and which offers a large surface area. No less important is the requirement that the fiber not be destroyed or damaged by the formation of ice crystals. The Zeo-Tech developers had a stroke of luck and chance in this matter. A fiber glass material is used in the prototype that easily withstands the countless evaporation and cooling processes.

Schwarz and his team of researchers is now working on the further development of the control and regulating technology and on optimizing the zeolite system. The refrigeration technicians expect better energy utilization through the use of aluminum heat exchangers that are dip-coated in zeolite powder with ceramic glue. Schwarz still cannot provide precise data on the system's power balance. It is to be ascertained in the coming months.

In any case, this year's Fair brought the refrigeration technicians an unexpected success. A "white goods" [linen] manufacturer in Saxony expressed interest in a cooperative venture. The first cool-boiler system could appear on the market as early as 1996.

Photo Captions

1. p. 27 (upper left): Heat and cold can be generated at lower cost and in an environmentally friendly manner by coupling the refrigerator and the hot water boiler. Only the boiler requires power; the refrigerator operates at no cost

Panel: Alternative Sources Cannot Meet Growing Energy Demand

94WN0280D Duesseldorf VDI NACHRICHTEN
in German No 18, 6 May 94 p 8

["Discussion on Future Energy Concepts"]

[Text] VDI-N, Cologne, 6 May 94, MG - During several lively discussion periods, agreement was found on many points when representatives from industry and the government held a panel discussion on the topic "Future Energy Concepts" at a joint session of the Friedrich Ebert Foundation and the VDE (Association of German Electrical Engineers) in Cologne on 28 April 1994.

Doctor Engineer Horst Lennertz, board member at Preussen Elektra, is convinced that the demand for power, and especially current, will continue to increase. To be sure, the consumption of current required for each individual application will be less, but the number of overall uses for electrical current will grow constantly. The electrical current requirements would have to be met by a mix of different primary power sources. For that reason,

German electrical companies will continue to rely on coal- and nuclear-powered plants, but current will also be generated from wind and solar power. Lennertz is further convinced that "at best, such regenerative sources could reach from 10% to 20% of the total share."

Dr. Hermann Scheer, a member of the Bundestag, takes strong issue: "There is absolutely no doubt that renewable power sources must eventually replace the sources that have been used to date." The president of Eurosolar has labeled the persistence of the electrical companies "structural conservatism." CO₂-emissions will only be significantly reduced when regenerative power sources occupy a substantially greater share of the total supply picture. A comprehensive support program for photovoltaics would help effect a swifter breakthrough.

"Structural changes take decades," Professor Ernst Ulrich von Weizsaecker believes and proposes his own long-term program. Were power costs increased annually by means of an energy tax by only 5%, but over a period of 50 years, neither the individual consumer nor any specific branch of industry would suffer. In this regard, the president of the Wuppertal Institute looks forward to an "efficiency revolution," by means of which the standard of living reached per energy unit could be increased by a factor of 4.

Adolf Huettl, member of the board at Siemens, remarked: "In all of these ideas about energy in the future, the simple fact that the worldwide demand for power will double by the year 2000. Without new fossil fuel-based and nuclear-power-based plants, this demand cannot be covered. It is true that regenerative power sources will gain in importance in the developing countries. German industry, as an exporter, is ready for this. Although German industry possesses the technological competence, it can only be maintained if the technologies are employed at home as well."

Germany Gearing up for Halon Disposal

94WN0291A Duesseldorf VDI NACHRICHTEN
in German No. 19, 13 May 94 p 20

[Article by Christa Friedel: "Halon Disposal on Verge of Being Launched"; Subheadline: "Extinguishing Agents Harmful to Ozone and Climate Eliminated in Plasma Jet"]

[Text]Duesseldorf, 13 May 1994—Halon harmful to the ozone and the climate have been banned in Germany since the start of the year. What is to be done, however, with the nearly 8,000 tons [t] from fire extinguishers and extinguisher systems? Solutions are now looming for the elimination of the especially stabile chemical substances.

The use of halons as a fire extinguishing agent in the event of a fire was a sure recourse for a long time for chemical firms, computer centers, the federal railway and even for many automobile operators. Halons extinguish quickly and reliably, they do not produce toxic gases and do not damage systems and equipment. Their special contents deserve the credit for all of that: chemical compounds that release chlorine, bromine and fluorine at high temperatures, putting a stop to the combustion process.

Those times are gone: since the start of the year, the ordinance prohibiting fluorochloro-hydrocarbons [FCKW] has banned the production, circulation and use of fully halogenated halons as an extinguishing agent. For such substances, similar to FCKW, are so chemically resistant that they rise undecomposed to an altitude of 20 kilometers [km] and destroy the protective ozone layer there, doing so considerably more rapidly than FCKW. Halon 1211 has been assigned an ozone destroying potential [ODP] that is triple that of R 11, the comparable FCKW substance; halon 1301's ODP, in fact, is higher by an order of magnitude. Additionally, both of them contribute to a large degree to the greenhouse effect.

For practical purposes three different halons basically matter: bromochloro-difluoromethane (halon 1211), bromotrifluoromethane (halon 1301), that had been used mostly in the former laender, and chlorobromomethane (halon 1011) from the new laender.

Making it particularly difficult to eliminate halon is its strong chemical resistance. Although in principle elimination in special waste incinerators is feasible, such a facility still can handle only limited amounts of input. "After all, halons are fire extinguishing agents," as Dr. Holger Brackemann, halon expert in Berlin's federal department of the environment, tosses out for consideration. More promising in this respect is a process of Plasmactor Umwelttechnik limited company [GmbH] from Britz in Brandenburg. In cooperation with Martin-Luther University in Halle, Merseburg college and a research institute in Minsk, White Russia, the firm has developed a plasma process that was just introduced for the first time at the Hannover fair.

In it the halon molecules are broken apart in a plasma jet. The plasma jet is generated in a plasma arc torch with air serving as plasma gas. At 10,000 degrees Celsius [C] the airborne oxygen splits up into avid radicals. Those radicals react in a reaction chamber that is approximately one meter in length with the halons and split off chlorine and bromine. Left over as resultants are hydrochlorine (HCl), hydrobromine (HBr), hydrofluorine (HF) and carbon dioxide.

In the second step, a sodium hydroxide solution is introduced through a nozzle at the end of the reactor chamber. HCl, HF and HBr acids react with the sodium hydroxide to yield sodium salts. This is followed by a cooling down to under 200°C. Solid-state salt that can be recycled in the industry is recovered from the salt solution via intermediate condensers and a number of filtering steps.

"Plasmactor's" special feature is use of a rotating plasma jet generated by two plasma torches in a staggered formation relative to one another. They ensure intense turbulences that powerfully intermingle air and halons so that reaction time is minimized and the conversion rate is increased. Plasmactor managing director Reinhardt Schulz succinctly states: "99.9 percent of the halons are converted."

Selection of materials that have to be especially resistant to heat is critical for the operation of the plasma reactor. The reactor consists of a double casing of high-grade steel through which the coolant flows. It envelops a 10-millimeter [mm] thick interior tube of aluminum oxide.

that is blended with a limited amount of other oxides. According to Schulz: "The interior tube is capable of withstanding reaction temperatures of nearly 2,000 degrees C without any problem." On the one hand a cooling jacket, and on the other hand the high flow rate of the gas in the tube counteract any overheating. According to Schulz, disposal costs are about seven German marks [DM] per kilogram [kg].

The "Chemical Reverser" of the Concentric Maschines [CM] firm in Treuchtlingen in Bavaria operates according to the same principle. In this case too, halons are broken apart in a plasma torch, this time under pressure at approximately 2,000-3,000°C. CM uses natural gas as plasma gas. The gas releases reactive hydrogen radicals that split apart chlorine, fluorine and bromine from the halon molecules. The resulting hydrogen halides are neutralized with a solution of caustic soda or caustic potash and cooled to 60°C in the process. Zettner's secret material is an inner lining of "a non-oxide ceramic" for the reactor that is to aggressive halides. Like Plasmactor managing director Schulz, CM developer Michael Zettner too hopes that the resulting potassium or sodium salts will find industrial customers.

In cooperation with Deutsche Aerospace AG [DASA], two CM facilities, each with 1,000 tons yearly capacity, are supposed to start operating on DASA sites in Treuchtlingen and in Schrobenhausen in Bavaria. According to Zettner: "The authorization process for one of the facilities is under way." In this connection he is pinning his hope on the effect of the new law facilitating investment that is supposed to scale the period for authorization down to a few months. Zettner's prognosis is: "We could get going with the disposal in the second half of the year."

But elimination of the substance solves only one side of the halon problem. Just as important is a dense network of collection and return centers for extinguishers. And that could be problematical: most of the 1.6 million portable fire extinguishers in private residences, business and vehicles in West Germany, in which close to 6,000 t of halon 1211 are lying dormant, are unregistered and as a result are beyond any monitoring. And whether the nearly 3,000 fixed extinguisher systems containing nearly 2,000 t of halon 1301 will be properly disposed of depends not least on the environmental awareness of the respective owners.

It will be even harder to bid adieu to the ozone destroyers in the new laender. Partially halogenated halon 1011 that is widespread in them is not encompassed by the Montreal Protocol and its production and use continues to be permitted.

Boom Seen for Recyclers with Great Increased Demand Forecast

94WN0291B Duesseldorf VDI NACHRICHTEN
in German No. 19, 13 May 94 p 1

[Article by Christa Friedl: "Increased Recycling Rewards Recyclers with Boom"; Subheadlines: "Entsorga 94: Every Third Exhibitor Offers Waste Recycling Products and Services"; "Community Facilities to Produce High-Quality Products from Used Materials Still Missing"]

[Text]Duesseldorf, 13 May 1994—Exhibitors at this year's Entsorga fair are encountering an optimum basis for business in Germany: the piles of waste are higher than ever before. According to estimates by the Federal Association for German Waste Disposal [BDE], last year they consisted of nearly 55 million tons [t] of household waste.

For this reason, recycling has never yet been so important as it is today. First, according to a forecast by the Berlin federal environmental department, by the year 2000, every other German household waste landfill will have used up its capacity. Second, against the backdrop of the fair, BDE's principal managing director, Frank-Rainer Billigmann, remarked: "Secondary raw materials afford the sector great opportunities." Numerous companies have already acknowledged this: almost every third one of the nearly 1,550 exhibitors at Entsorga, from 18 to 21 May in Cologne, is offering technologies, products and services centered on secondary raw materials.

Still, it is easier to champion recycling than to practice it. On the one hand, the recycling bill passed by the federal parliament in April, expands the amounts of used material piling up each year for recycling. On the other hand, private waste disposers and communities for the most part still do have facilities to produce products from used materials using modern technology. The market itself is another hurdle for recycling. As noted in a report on the sector that has just been submitted by the market research firm of AIK [expansion not given] Kohlhaas & Partner in Krefeld: "Only if the price of used materials covers the cost of collection systems can one expect a working waste recycling system." The Krefeld firm considers continued development of environmental engineering in the direction of improved processes for recycling of used material as the greatest prospect for the used materials business. Better analysis and more effective sorting techniques will result in purer sorting and, as a result, more valuable secondary materials.

The sector's response to the recycling boom is the creation of financially powerful waste disposal companies. But this development is not meeting with general approval. Michael Mueller, environmental spokesman for the Social Democratic Party of Germany [SPD] remarks: "The processes leading to concentration in the waste disposal business undercut competition." A major parliamentary question to the federal administration in March by the SPD aims at examining the threat of monopolization. BDE spokesman Hanskarl Willms is also convinced: "Concentration will continue in the sector. Many waste disposal tasks can be tackled only by financially powerful companies because of their sophisticated facilities and technologies."

There is hardly any doubt that the large number of waste disposal tasks will grow even more in the future. The reason is that waste avoidance has so far been hardly successful. According to AIK managing director Edgar Kohlhaas: "The political machinery is missing." According to his prediction, even in the future there will be no decline in the amounts of waste material, at best they will hold steady. The new recycling law already acknowledges this: in it recycling is not valued any higher than incineration.

IRELAND

New Agency To Curb Chemical Pollution

94WN0288A Dublin IRISH INDEPENDENT
in English 18 Apr 94 p 7

[Article by Tony O'Brien, environment correspondent:
"New Bid To Curb Chemical Pollution"]

[Text] Tough new controls on the country's chemical industry are to be introduced by Environmental Protection Minister John Browne.

Other areas of industry will also be targeted.

This will be done through the new Wexford-based Environmental Protection Agency (EPA) which will issue a series of detailed licences covering a range of industrial operations from the middle of next month.

Although the licensing system will not initially cover the pharmaceutical industry, it is known that Mr Browne is anxious to bring this into place as quickly as possible, particularly because of accidents at Cork plants last summer.

Cork Co Council had been asked to review the licence for the Hickson plant at Ringaskiddy, where a major fire took place last year, but has failed to do so. The EPA will now have the job.

The new regulations, which come into force on May 16, mean the EPA will be responsible for licensing various operations which have pollution potential.

These include chemicals, food and drink, minerals and other materials, energy, wood, paper, textiles and leather, cement and waste.

Other activities will be phased into the licensing system and Mr Browne has said that large-scale manufacture of pesticides, pharmaceutical or veterinary products and the incineration of waste will come into the EPA's scope from September 1.

Mr Browne said: "I am determined that large-scale, complex and specialised activities should come within the EPA's control as rapidly as possible and I will be keeping a watch on the level of new activity in the various categories and how the system works."

SWEDEN

Prime Minister Irritated by Call for Rapid Oresund Bridge Decision

PM0306134494 Stockholm SVENSKA DAGBLADET
in Swedish 1 Jun 94 p13

[Elisabeth Crona report: "Oresund Bridge Causes War of Words"]

[Excerpt] A new war of words has broken out between the Swedish and Danish prime ministers—this time over the Oresund bridge.

"Poul Nyrup Rasmussen is making dealing with the issue more difficult. It will not be decided by diktat from Denmark," Carl Bildt said when he received reports of his Danish counterpart's remarks at the annual national conference of the Federation of Swedish Farmers in Karlstad yesterday.

After a Danish cabinet meeting yesterday morning Nyrup Rasmussen had spoken of "the delay which has already affected the project" and urged the Swedish Government to reach a swift decision:

"I would ideally like to avoid an expression like 'weeks,' he said, wanting to talk more in terms of days if not hours now that SMHI [Swedish Meteorological and Hydrological Institute] and its Danish counterpart, DHI [Danish Hydraulic Institute], had in their calculations confirmed a zero solution for water throughflow.

"To be frank I am surprised that Poul Nyrup Rasmussen is holding press conferences about what is Sweden's business, before the Swedish Government has even been able to read the relevant material," Bildt said adding, in a travesty of "something rotten in the state of Denmark," that there is "something strange going on in Denmark." (A comment on a statement from Nyrup Rasmussen about changes in the planned construction of the bridge.)

Yesterday afternoon neither the Swedish Environment Ministry nor the Prime Minister's Office had received the documentation which the Oresund Bridge Consortium had posted in Malmo on Monday.

Carl Bildt and [Environment Minister] Olof Johansson are agreed in one respect about handling the issue in the future. It will be treated as an administrative matter—hence the irritation with the Danes' stressing Sweden's political will to arrive at a swift decision.

The Swedish Environment Ministry's strategy is to be pedantic and correct.

"We do not want a complaint to the Supreme Administrative Court," said one of Olof Johansson's experts, who is "almost certain" that the professional fishermen in the area will appeal if the examination of the environmental effects of the bridge is not carried out to the letter.

Olof Johansson himself said that he will not allow himself to be rushed and that the bridge issue is such that it ought to be decided in an election.

There is, however, a sensitive point in the Swedish Government's future handling of the bridge question. According to information received by SVENSKA DAGBLADET, the Environment Ministry is going to want to send the new calculations of south-flowing water currents in the Baltic Sea back to the Water Rights Court. Reference is made here to the press statement of 13 January which states that the court's ruling will be of decisive importance when the government comes to reach a decision on the issue.

Carl Bildt on the other hand has said that he finds it "difficult to see" why the issue must be brought before the Water Rights Court again. [passage omitted]

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